
FIELDIANA

Botany

NEW SERIES, NO. 29

PTERIDOPHYTA OF PERU

Rolla M. Tryon

*Department of Biology
University of South Florida
Tampa, Florida 33620-5150*

Robert G. Stolze

*Associate Curator
Department of Botany
Field Museum of Natural History
Chicago, Illinois 60605-2496*

Part III

16. Thelypteridaceae

Contributed by:

Alan R. Smith

*University Herbarium
University of California
Berkeley, California 94720*

Accepted December 2, 1991

Published April 30, 1992

Publication 1433

PUBLISHED BY FIELD MUSEUM OF NATURAL HISTORY

© 1992 Field Museum of Natural History

Library of Congress Catalog Card Number: 92-81361

ISSN 0015-0746

PRINTED IN THE UNITED STATES OF AMERICA

Table of Contents

INTRODUCTION	1
ACKNOWLEDGMENTS	1
16. THELYPTERIDACEAE	2
<i>Macrothelypteris</i>	3
<i>Thelypteris</i>	5
subg. <i>Thelypteris</i>	6
subg. <i>Amauropelta</i>	9
subg. <i>Cyclosorus</i>	39
subg. <i>Steiropteris</i>	46
subg. <i>Goniopteris</i>	52
subg. <i>Meniscium</i>	66
MAP OF PERU	77
INDEX TO NAMES	78

List of Illustrations

1. <i>Macrothelypteris</i> : <i>M. torresiana</i>	4
2. <i>Thelypteris</i> , subg. <i>Thelypteris</i> : <i>T. palustris</i> ; <i>Dryopteris</i> (= <i>Thelypteris</i>) <i>tremula</i> ..	7
3. <i>Thelypteris</i> , subg. <i>Amauropelta</i> : <i>T. glandulosolanosa</i>	8
4. <i>Thelypteris</i> , subg. <i>Cyclosorus</i> : <i>T. depilata</i> ..	38
5. <i>Thelypteris</i> , subg. <i>Steiropteris</i> : <i>T. valdepi- losa</i>	47
6. <i>Thelypteris</i> , subg. <i>Goniopteris</i> : <i>T. biolleyi</i> ..	53
7. <i>Thelypteris</i> , subg. <i>Meniscium</i> : <i>T. maxon- iana</i>	72

Back cover: Thelypteris valdepilosa

PTERIDOPHYTA OF PERU

Part III

16. Thelypteridaceae

Introduction

Due to unforeseen delays, this third part of the "Pteridophyta of Peru" has been published subsequent to Part IV, Dryopteridaceae, but the format follows that of all previously published parts. Format is explained in Part I (*Fieldiana: Botany*, n.s. No. 20, 1989), and it is not necessary to repeat it here. The publication of two more parts will complete the project, contrary to the announcement in the Introduction to Part I that the fern flora would be divided into five parts. Part V, nearing completion, will contain the Aspleniaceae and Polypodiaceae. Part VI, just begun, will treat the heterosporous ferns and the "fern allies," and also will include a section dealing with the biogeography.

The authors are extremely fortunate to have had the cooperation of Dr. Alan Smith, University of California, Berkeley, who contributed this comprehensive treatment of the Thelypteridaceae. Not only is Dr. Smith the acknowledged authority on the family, but he recently produced the treatment of Thelypteroideae for the *Flora of Ecuador* (1983); thus, even before beginning work on the Thelypteridaceae of Peru, he had a good understanding of Andean species. Two genera and 102 species are recognized in Peru, 19 species of which are described herein as new. In the section labeled "Comments" following subg. *Amauropelta*, there are descriptions of two of these novelties that came to the author's attention after the manuscript had been completed.

The type of each name has been determined when possible, and an effort has been made to see the holotype or at least type photographs or authentic material. Voucher specimens cited in the legends are from Peru unless otherwise indicated.

Original drawings illustrate diagnostic features of genera and subgenera, and some of the species. Voucher specimens cited in the legends are from Peru unless otherwise indicated. The map of Peru at the end of the text shows the Departments and indicates the sequence of the collection citations.

The nomenclature of the genera and species is not intended to be complete. Synonyms are listed when they are considered useful and when the type of the name of a species or infraspecific taxon is from Peru.

Abbreviations of periodical publications generally follow the system of *Botanico-Periodicum-Huntianum* (1968), and abbreviations of authors' names and of books generally follow *Taxonomic Literature* by Stafleu and Cowan (TL-2, 1976 *et seq.*).

Acknowledgments

The original drawings were contributed by Zorica Dabich, scientific illustrator at Field Museum. We express our sincere appreciation for her outstanding work and for her patience and understanding. We also appreciate comments on the manuscript by several reviewers.

We are indebted to Blanca León, of the Universidad Nacional Mayor de San Marcos (USM) in Lima, for verification of the identity of duplicate specimens cited herein from HUT and USM. Dr. Smith has been unable personally to examine these during the course of his study.

We are deeply grateful to Dr. Rolf Singer, Research Associate in the Department of Botany at Field Museum, for checking the accuracy of the Latin descriptions and diagnoses for the 19 new species published herein.

We extend our thanks to the officers of the following institutions for granting loans of their material or allowing us to examine specimens in their herbaria: Botanical Institute, University of Aarhus, Denmark (AAU); Botanischer Garten und Botanisches Museum, Berlin-Dahlem, Berlin (B); Bailey Hortorium, Cornell University, Ithaca (BH); The Natural History Museum [formerly British Museum (Natural History)], London (BM); Jardin Botanique National de Belgique, Meise (BR); Botanical Museum, Copenhagen (C); Dudley Herbarium of Stanford University (DS); Field Museum of Natural History, Chicago (F); Conservatoire et Jardin Botaniques de la ville de Genève (G); Botanical Museum, Göteborg (GB); Harvard University Herbaria, Cambridge, Mass.—most Gray Herbarium (GH), some Arnold Arboretum (A); Herbarium Truxillense, Universidad Nacional de Trujillo, Trujillo, Peru (HUT); Royal Botanic Gardens, Kew, England (K); Rijksherbarium, Leiden, The Netherlands (L); Botanical Museum, Lund (LD); Botanische Staatssammlung, München (M); University of Michigan, Ann Arbor, Mich. (MICH); Missouri Botanical Garden, St. Louis (MO); New York Botanical Garden, New York (NY); Muséum National d'Histoire Naturelle, Paris (P); Swedish Museum of Natural History, Stockholm (S); Herbarium, University of Tennessee, Knoxville (TENN); Institute of Systematic Botany, Utrecht (U); University of California, Berkeley (UC); Botanical Museum, Uppsala (UPS); United States National Herbarium, Smithsonian Institution, Washington, D.C. (US); Museo de Historia Natural "Javier Prado" de Universidad Nacional Mayor de San Marcos, Lima, Peru (USM); Herbario Nacional de Venezuela, Caracas (VEN); Naturhistorisches Museum, Vienna (W); and Institut für Systematische Botanik, Universität, Zürich (Z).

This project has been supported in part by grant BSR-85-16358 from the National Science Foundation, Systematic Biology Program. The work would not have been possible without this assistance. However, any opinions and conclusions expressed are those of the authors and do not necessarily reflect the views of the Foundation.

Family 16. THELYPTERIDACEAE

Thelypteridaceae Pic.-Ser., *Webbia* 24: 711. 1970.

TYPE: *Thelypteris* Schmidel.

Stem erect or decumbent, stout to slender, bearing usually pubescent scales and many fibrous or

sometimes rather few thick roots, dictyostelic. **Leaves** small to large (0.1–5 m), circinate in vernation, monomorphic to less often subdimorphic, rarely strongly dimorphic, if dimorphic then the fertile erect and with smaller segments than the sterile, clustered to widely spaced. **Petiole** lacking stipules, not articulate to stem, at base with two lunate vascular bundles, these fusing distally into one U-shaped bundle. **Lamina** simple to often 1-pinnate or 1-pinnate-pinnatifid, infrequently 2-pinnate or up to 3-pinnate-pinnatifid. **Indument** of trichomes, these commonly acicular, furcate, stellate, capitate-glandular, or septate, scales uncommonly also present on axes but never on laminar tissue. **Veins** free to fully anastomosing, the areolae lacking included veinlets or with a single excurrent veinlet. **Sori** borne on veins on the abaxial surface of lamina, round to occasionally oblong or elongate, sometimes arcuate at the juncture of cross-veins, very rarely the sporangia acrostichoid; paraphyses absent or occasionally present; indusia well developed and round-reniform to small and spathulate, or lacking. **Sporangia** with a 3-rowed stalk, annulus vertical, interrupted by the stalk. **Spores** bilateral, monolete, surface reticulate or with more or less connected, winglike, often perforate ridges, or surface variously verrucate to papillate or echinate (spores globose and trilete in the Old World *Trigonospora*). $x = 27, 29-36$.

Genera in this family are variously circumscribed, with all species placed in a single genus *Thelypteris*, or the family subdivided into about 30 genera. If an extreme view is taken, nine genera are known from Peru (i.e., *Amauropelta*, *Amphineuron*, *Christella*, *Cyclosorus*, *Goniopteris*, *Macrothelypteris*, *Meniscium*, *Steiropteris*, and *Thelypteris sensu stricto*), but I adopt a conservative classification, with one introduced species in the genus *Macrothelypteris* and all others from the region in *Thelypteris*. The family is subcosmopolitan, with most species in tropical and subtropical regions, and is characterized by having two lunate vascular bundles in the petiole, acicular or other kinds of trichomes on the leaves, generally bilateral spores with a broad perispore, generally round sori on the veins abaxially, and chromosome base numbers varying from 27 to 36 (29, 35, and 36 being the only numbers found in native Neotropical species).

References

CHRISTENSEN, C. 1913. A monograph of the genus *Dryopteris* I. The tropical American pin-

natifid-bipinnatifid species. Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 10: 53–282.

HOLTUM, R. E. 1971. Studies in the family Thelypteridaceae III. A new system of genera in the Old World. *Blumea* 19: 17–52.

Key to Genera of Thelypteridaceae

- a. Lamina 2-pinnate-pinnatifid; axes adaxially lacking grooves I. **Macrothelypteris**
a. Lamina simple to 1-pinnate-pinnatifid, rarely 2-pinnate; axes adaxially grooved . . . II. **Thelypteris**

I. **Macrothelypteris**

Macrothelypteris (H. Itô) Ching, *Acta Phytotax. Sinica* 8: 308. 1963. **Figure 1.**

Thelypteris sect. *Macrothelypteris* H. Itô in Nakai & Honda, *Nov. Fl. Jap.* 4: 141. 1939. TYPE: *Thelypteris oligophlebia* (Baker) Ching = *Macrothelypteris torresiana* (Gaud.) Ching.

Thelypteris subg. *Macrothelypteris* (H. Itô) A. R. Sm., *Phytologia* 34: 233. 1976.

Terrestrial. **Stem** short-creeping, thick, 10 mm in diameter. **Lamina** 2-pinnate-pinnatifid nearly throughout, broadest at the base, apex gradually reduced; pinnae 1-pinnate-pinnatifid, sessile or stalked; costae not grooved adaxially; buds and aerophores absent. **Veins** free, often forked, tips not reaching the margin. **Indument** abaxially of unbranched septate trichomes mostly over 1 mm long, rachis and costae lacking scales. **Sori** round, medial to supramedial; indusia small, less than 0.3 mm in diameter, often obscured in mature sori; sporangial capsules bearing short-stipitate glands. **Spores** with coarse, more or less connected, perforate ridges and a finely reticulate surface. $x = 31$.

There is one widely naturalized species in tropical and subtropical America. It can be confused in gross aspect more with such dryopteroid genera as *Ctenitis*, *Megalastrum*, and *Lastreopsis* than with *Thelypteris*. However, *Macrothelypteris* agrees with *Thelypteris* in having acicular trichomes, two vascular bundles in the petiole, and the lower base chromosome number.

There are ca. 10 species of *Macrothelypteris* native to tropical and subtropical Asia, Pacific Islands, Queensland, and Africa.

Reference

HOLTUM, R. E. 1969. Studies in the family Thelypteridaceae. The genera *Phegopteris*, *Pseudo-*

SMITH, A. R. 1983. Polypodiaceae-Thelypteroidae. In Harling, G. and B. Sparre, eds., *Flora of Ecuador*, no. 18: 18–148.

phegopteris, and *Macrothelypteris*. *Blumea* 17: 5–32.

1. **Macrothelypteris torresiana** (Gaud.) Ching, *Acta Phytotax. Sinica* 8: 310. 1963. **Figure 1.**

Polystichum torresianum Gaud. in Freyc., *Voy. Uranie*. 333. 1828. TYPE: Mariana Islands, *Gaudichaud* (holotype, p).

Aspidium uliginosum Kunze, *Linnaea* 20: 6. 1847. LECTOTYPE (chosen by Morton, *Contr. U.S. Natl. Herb.* 38: 219. 1973): Cult. Hort. Bot. Leipzig, origin Java (BR; photo, US).

Dryopteris uliginosa (Kunze) C. Chr., *Index fil. suppl.* 3: 100. 1934.

Thelypteris torresiana (Gaud.) Alston, *Lilloa* 30: 111. 1960.

Stem short-creeping, scales brown, shiny, lanate, setose on margins and surface. **Leaves** few, approximate, 60–150 cm long. **Lamina** chartaceous, 2-pinnate-pinnatifid, proximal pair of pinnae the longest or sometimes greatly reduced and the next pair the longest. **Petiole** to 85 cm \times 3–12 mm, stramineous or greenish and scaleless above the base, often glaucous. **Rachis** glabrous or with sparse septate trichomes abaxially. **Pinnae** sessile to stalked, to 35 \times 17 cm, 1-pinnate-pinnatifid, the pinnules short-stalked to mostly slightly adnate, 2–8 \times 0.8–2.5 cm, incised almost to costule into oblique segments 2–4 mm wide, these entire to crenate or pinnatifid. **Aerophores** absent. **Buds** lacking. **Veins** forked or unbranched. **Indument** of costae and veins abaxially of scattered, spreading, septate trichomes mostly 1–2 mm, axes and sometimes laminar tissue with inconspicuous capitate glands 0.1 mm, costal scales lacking, lamina adaxially with sparse setae to 0.5 mm on costules and veins. **Sori** medial, round, indusia 0.2–0.4 mm in diameter, hidden by mature sporangia, glabrous or sparsely setose, receptacle glabrous, sporangia with capitate glands near annulus.

Edges of lowland forests, 200–800 m, Amazonas, San Martín, Loreto, Huánuco, and Madre de Dios.

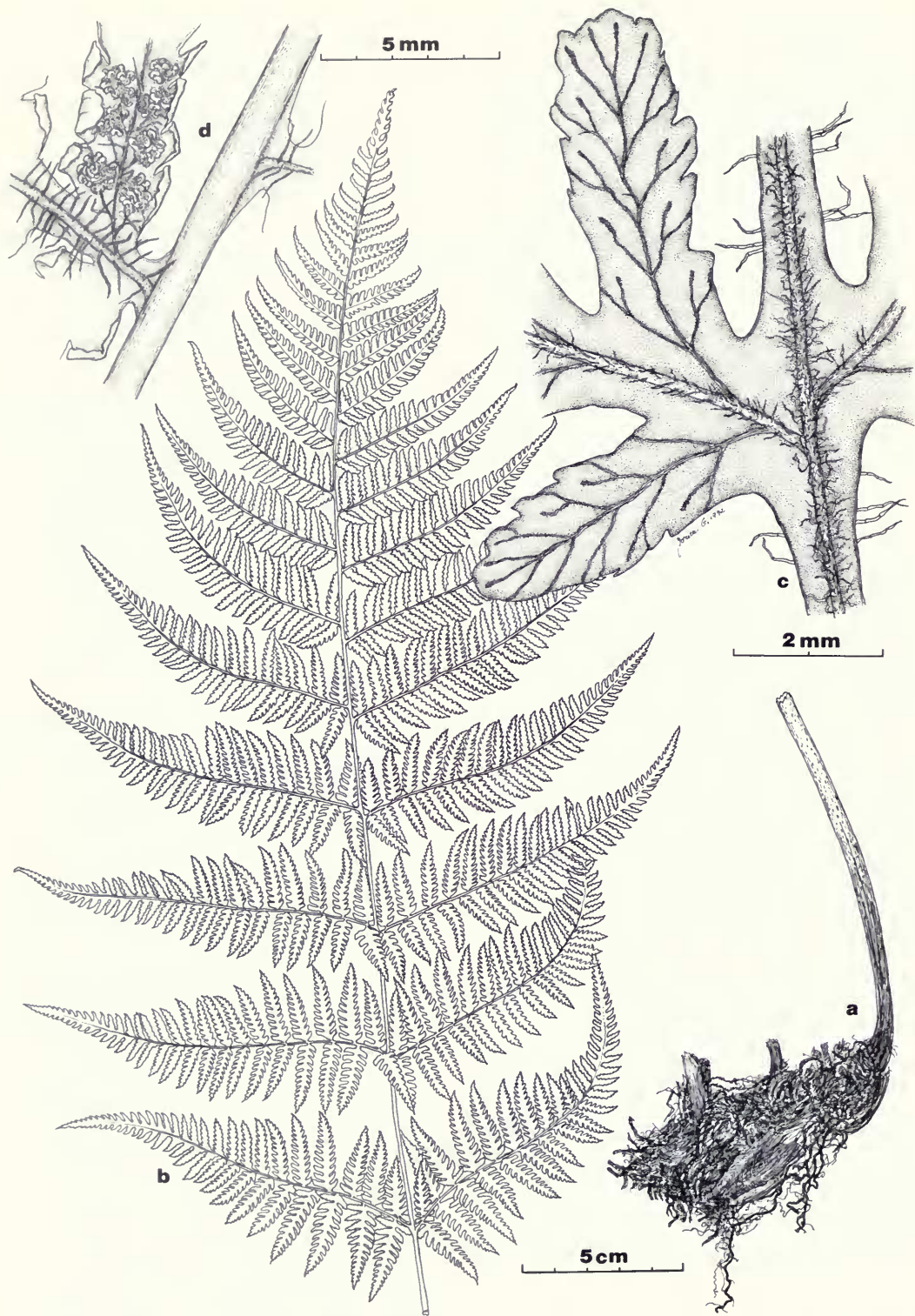


FIG. 1. *Macrothelypteris torresiana*: a, portion of stem and petiole; b, lamina; c, portion of costa with pinnule base, adaxial side, two basal segments; d, distal portion of rachis and pinna base, abaxial side, with basal acroscopic pinnule. (a, c, d from Anderson 9958, Brazil, uc; b from Stolze 1498, Costa Rica, F.)

Southeastern United States; Antilles; Mexico to Panama; Colombia to Bolivia; southern Brazil; northern Argentina; Paraguay; tropical and subtropical Africa and Asia; Pacific Islands. Adventive in the New World tropics and subtropics. The earliest collection seen from Peru was made in 1978.

Amazonas: Prov. Bagua, Chiriaco to Puente Venezuela, 43 km NE of Chiriaco, *Barbour 4380* (MO, USM), 4404 (MO, USM). **San Martín:** San Martín, 15 km E of Shapaja on road to Chazuta, *Knapp 7876* (F, MO). San Martín, Km 28 of Tarapoto-Yurimaguas road, *Knapp & Mallet 8395* (MO). **Loreto:** Prov. Alto Amazonas, Andoas Pastaza, *Vásquez & Jaramillo 791* (F, MO), 792 (MO). **Huánuco:** Prov. Leoncio Prado, Dist. Rupa Rupa, Jacintillo, Río Monzón, *Schunke V. 10367* (F, MO, USM). Along road from Tingo María to Monson (Monzón), *Croat 57922* (MO, USM). **Madre de Dios:** Prov. Manú, Parque Nacional Manú, Río Manú, Cocha Cashu Station, *R. Foster 11429* (F, USM).

II. *Thelypteris*

Thelypteris Schmidel, Icon. pl. (ed. Keller), 3rd page, t. XI text. 1763 (*nom. cons.*). TYPE: *Thelypteris palustris* Schott (*Acrostichum thelypteris* L.).

Terrestrial or epipetric, rarely epiphytic. Stem creeping to ascending or erect, rarely scandent. **Lamina** 1-pinnate to 1-pinnate-pinnatifid, rarely simple or 2-pinnate, proximal pinnae reduced or not, apex commonly gradually reduced, infrequently abruptly reduced and pinnalike; pinnae entire to deeply pinnatifid, rarely 1-pinnate, sessile or short-stalked; costae grooved adaxially; buds absent or present in axils of pinnae; aerophores absent to present at pinna bases, these tuberculiform or scalelike. **Veins** free to regularly anastomosing, commonly simple, rarely 1–2-forked, reaching the margin. **Indument** various abaxially, often of simple or branched trichomes on axes and lamina, trichomes infrequently septate, rachis and costae with or usually without scales. **Sori** round, oblong, or elongate along veins, commonly infra-medial to supra-medial; indusia round-reniform, large (ca. 1 mm in diameter) and persistent or small (less than 0.3 mm), occasionally fugacious, sometimes absent; sporangial capsule glabrous or occasionally setose or bearing inconspicuous glands from the stalk. $x = 27, 29, 31-36$.

Key to Subgenera of *Thelypteris*

- a. At least some of the trichomes on the rachis, costae, and/or stem apex scales forked or stellate . . .
 (species 64, 65, 68–81) . . . IIe. *Thelypteris* subg. **Goniopteris**

As treated here, *Thelypteris* comprises ca. 875 species and is subcosmopolitan, with greatest concentration in the tropics. Nearly 300 species are found in the New World. The genus is usually divided into numerous subgenera or sections that are sometimes treated as genera. These groups, although mostly natural and probably monophyletic, are definable only by a combination of characters. Some of the characters concern minute details of glands and trichomes and require 30× magnification or greater for observation. Others require that complete specimens be at hand, including the proximal part of the lamina and the stem. Hybridization between the groups is known or suspected and transitional species and species groups occur. Some of the best characters for circumscribing the groups involve chromosome number and characters of spores best seen with the scanning electron microscope. Because of the practical problems of identification, as well as uncertainty over degree of relatedness, a conservative classification is adopted here.

Thelypteris is probably one of the most poorly collected fern genera in Peru, as many species are known only from the type or just a few collections. This is probably because many species are very similar in lamina dissection, and collectors generally avoid them after making a few token gatherings. It would not be surprising if the number of species in the country grows by 25% or more as additional areas become open to collectors and as specialists visit remote and species-rich areas.

In Peru, subgenera *Amauropelta* and *Thelypteris* s.s. stand somewhat apart from the other subgenera by virtue of their distinctive spores, chromosome number, and venation; species of the former also have reduced proximal pinnae, although these often go unnoticed or uncollected because they are mere nubbins less than a few mm long. The other four subgenera form a large natural assemblage that could comprise a separate genus, *Cyclosorus*.

The descriptions of species are drawn from Peruvian specimens except in the cases where the material is sparse or otherwise inadequate. In those cases, the descriptions are amplified by material from elsewhere in the range, particularly Ecuador.

References

Listed under the appropriate subgenus.

- a. Trichomes all unbranched (fasciculate in 3 species of subg. *Amauropelta*), acicular, unicellular or multicellular, rarely trichomes absent b
- b. Lamina 1-pinnate, the pinnae entire or margin undulate or serrate, or pinnae incised less than halfway to the costa; veins regularly anastomosing, the areoles formed by uniting cross-veins 3–25-seriate between costa and margin c
- c. Sori mostly discrete; sori indusiate (species 66, 67, 82) . . . Iie. **Thelypteris** subg. **Goniopteris**
- c. Sori mostly confluent where the veins anastomose, thus oblong or lunate (except sometimes in *T. lingulata*); sori exindusiate (species 83–98) . . . Iif. **Thelypteris** subg. **Meniscium**
- b. Lamina 1-pinnate-pinnatifid or rarely 2-pinnate, the pinnae usually incised half their width or more; veins meeting margin above the sinus, connivent at the sinus, or with 1 or 2 pairs anastomosing below the sinus d
- d. Veins 1–2-forked in the ultimate segments; proximal pinnae not or only slightly shorter than the longest pair; lamina 2-pinnate (species 1) . . . Iia. **Thelypteris** subg. **Thelypteris**
- d. Veins usually simple in the ultimate segments; proximal pinnae much shorter than the longest or not; lamina usually 1-pinnate-pinnatifid, rarely 1- or 2-pinnate e
- e. Lamina with 1 or usually several to many pairs of reduced proximal pinnae, lowermost auriculiform, glanduliform, or hastate; veins free, meeting margin above the sinus or rarely at the sinus (species 2–47) . . . Iib. **Thelypteris** subg. **Amauropelta**
- e. Lamina without reduced proximal pinnae, or if reduced pinnae present, then veins united below sinus f
- f. Cartilaginous keel or minutely pubescent false vein running from sinus toward costa, occasionally lacking; indusia present or absent; aerophores peglike or scalelike at pinna bases (species 57–63) . . . Iid. **Thelypteris** subg. **Steiopteris**
- f. Cartilaginous keel lacking; indusia present, persistent; aerophores absent at pinna bases (species 48–56) . . . Iic. **Thelypteris** subg. **Cyclosorus**

1a. **Thelypteris** subg. **Thelypteris**. Figure 2.

Lamina 1-pinnate-pinnatifid to 2-pinnate; proximal pinnae not reduced or only slightly reduced relative to the longest pair, distal pinnae gradually shortened, the lamina with a confluent pinnatifid apex; aerophores absent; buds absent. **Veins** from adjacent segments meeting margin above the sinus, simple or often 1–2-forked. **Indument** of acicular, often septate crisped trichomes, also of tan, broadly ovate scales along the abaxial costae, often with sessile or stipitate glands. **Sori** round, indusiate; sporangia glabrous. **Spores** various, with a reticulate to verrucate, papillate, or echinate perispore. $x = 35$.

Subgenus *Thelypteris* comprises only 2 widespread species: *T. palustris*, north-temperate in Canada and eastern United States, Europe, and Asia; and *T. confluens* (Thunb.) Morton, south-temperate in Argentina, Africa, and India to New Zealand and New Guinea.

References

FERNALD, M. L. 1929. A study of *Thelypteris palustris*. *Rhodora* 31: 27–40.

TRYON, A. F., R. TRYON, AND F. BADRE. 1980. Classification, spores, and nomenclature of the Marsh fern. *Rhodora* 82: 461–474.

1. **Thelypteris palustris** Schott, Gen. fil., *sub tab.* 10. 1834. Figure 2a–c.

Acrostichum thelypteris L., Sp. pl. 2: 1071. 1753. TYPE: “in Europae septentrionalioris paludibus” (typification uncertain).
Dryopteris thelypteris (L.) A. Gray, Manual, ed. 1. 630. 1848.

Stem long-creeping, 1–3 mm in diameter, scales few, tan, glabrous or glandular on margin. **Leaves** usually several cm apart, monomorphic or slightly dimorphic with the fertile more erect, narrower, and with somewhat contracted pinnae and segments, 20–90(–120) cm long. **Lamina** membranaceous to chartaceous, 1-pinnate-pinnatifid to 2-pinnate, proximal pinnae not or only slightly reduced. **Petiole** 9–45(–60) cm × 1–3 mm, tan to stramineous above the blackened base, at base glabrous or with sparse, tan, ovate, glabrous scales. **Rachis** with crisped, septate trichomes to 1 mm abaxially, also with a few deep red glands ca. 0.1 mm. **Pinnae** sessile or short-stalked to 1 mm,

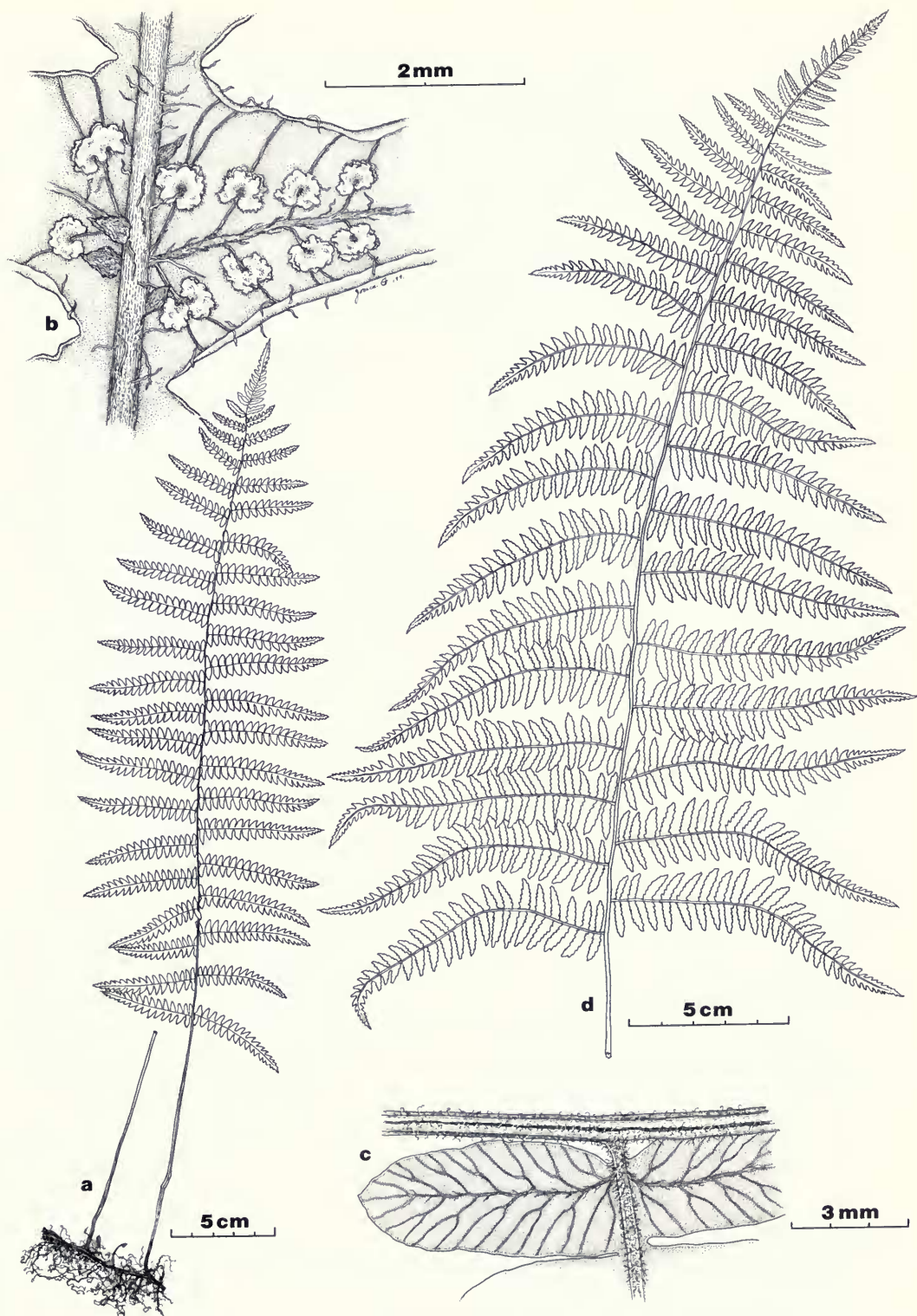


FIG. 2. Subgenus *Thelypteris*. *Thelypteris palustris*: a, stem and leaf; b, costa and base of pinna segment, abaxial side; c, rachis and base of pinna, adaxial side. *Dryopteris* (= *Thelypteris*) *tremula*: d, lamina. (a, c from Stolze 279, Illinois, U.S.A., F; b from Camp, in 1897, Michigan, U.S.A., F; d from Arsène, in 1910, Mexico, UC.)

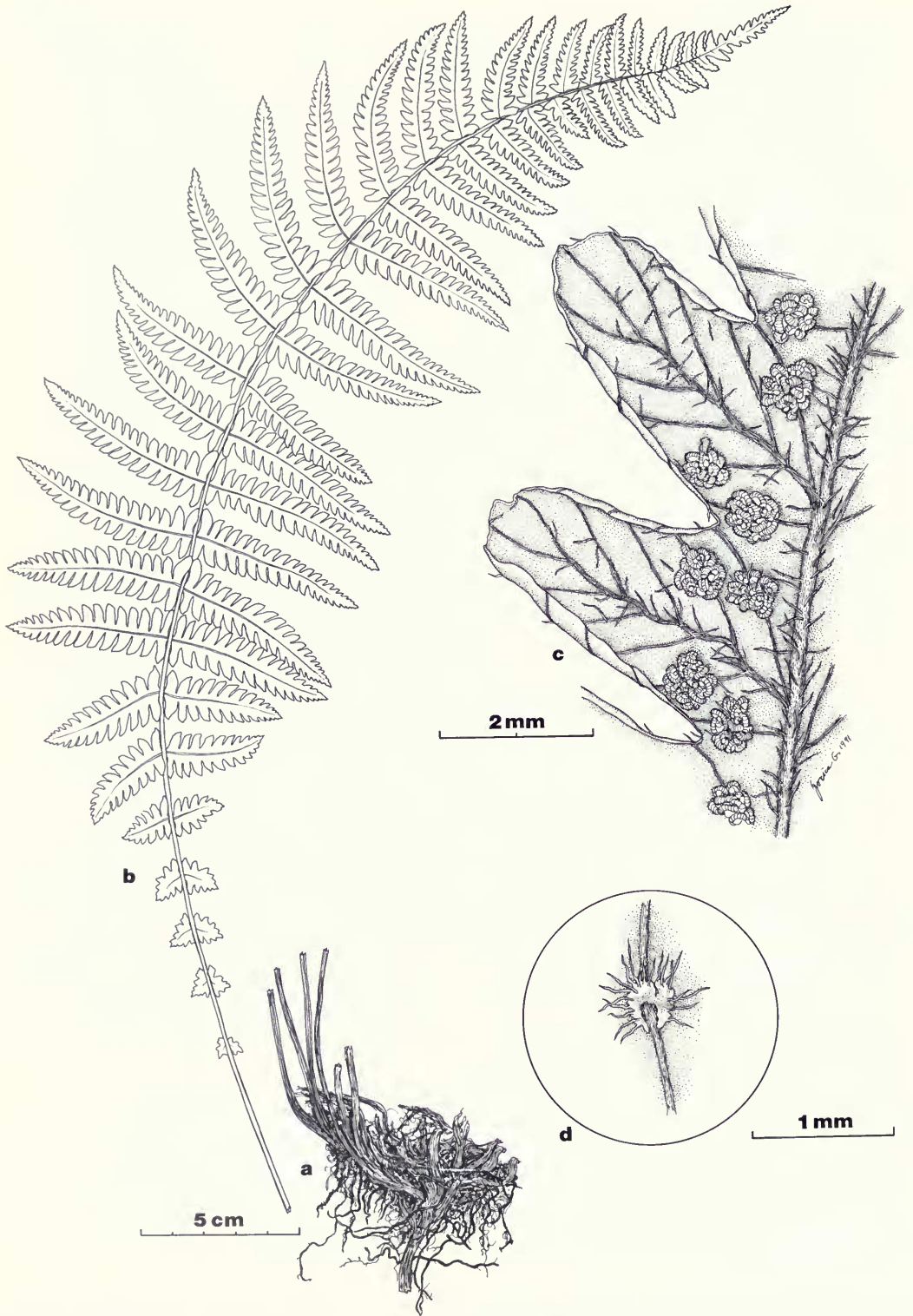


FIG. 3. Subgenus *Amauropelta*. *Thelypteris glandulosolanosa*: a, stem and petiole bases; b, lamina; c, pinna segments, abaxial side; d, sorus (sporangia removed). (a, c, d from Woytkowski 172, uc; b, from Feuerer 8127a, Bolivia, F.)

2–10(–12) × 0.5–2(–2.5) cm, deeply pinnatifid to 1-pinnate and the pinnules entire, crenate, or shallowly lobed. **Aerophores** absent. **Buds** lacking. **Veins** 4–10 pairs per segment, often 1–2-forked, especially in sterile fronds. **Indument** of costae and veins abaxially of acicular and crispate, septate trichomes 0.3–1 mm, also with a few deep red, sessile or short-stalked, pear-shaped glands, costal scales tan, ovate, with a few similar glands on margin, adaxially glabrescent or with scattered trichomes on costules and veins, laminar tissue glabrous. **Sori** medial, round, with a usually large indusium, receptacle and sporangia glabrous or the latter sometimes glandular.

Growing on floating mats with lacustrine vegetation, elsewhere in the range from marshes and swamps, 2000 m, Amazonas.

Eastern Canada and United States; Cuba; Bermuda; perhaps Mexico; north-temperate Europe and Asia.

The sole Peruvian collection is sterile and without stem, so the precise identity is uncertain. It is clearly assignable to subg. *Thelypteris* on the basis of the crispate pubescence, forked venation, tan, ovate costal scales, and pear-shaped glands at the scale margins and along rachis, costae, and costules abaxially. This specimen is larger (extreme measurements in description above) and more dissected than most specimens of *T. palustris* from the north-temperate areas, being fully 2-pinnate with shallowly lobed pinnules on the proximal pinnae. In these characters, it matches some specimens from southeastern United States and especially *Dryopteris tremula* Christ (fig. 2d), known only from the type and topotypes collected by Arsène in Michoacán, Mexico, in 1910. The Arsène collections resemble some specimens of *Thelypteris palustris* from Louisiana, where he also collected, and mislabeling is a possibility. Additional collections are necessary to determine whether the Peruvian species is really *T. palustris*, and if so, to which of several varieties it is allied.

Amazonas: Bongará Prov., Pomacochoa, *D. Smith* 6020 (MO, USM).

IIb. *Thelypteris* subg. *Amauropelta*.

Thelypteris subg. *Amauropelta* (Kunze) A. R. Sm., *Amer. Fern J.* 63: 121. 1973. **Figure 3.**

Amauropelta Kunze, *Farnkr.* 1: 109. 1843. **TYPE:** *Amauropelta breutelii* Kunze = *Thelypteris limbata* (Sw.) Proctor.

Lamina 1-pinnate to 1-pinnate-pinnatifid, rarely 2-pinnate; proximal pinnae usually gradually to abruptly reduced, mostly 4 or more pairs (rarely only 1), lowermost pairs sometimes glanduliform, distal pinnae gradually shortened, the lamina with a confluent pinnatifid apex; aerophores at pinna bases often present; buds absent in all but 2 of our species. **Veins** from adjacent segments usually meeting margin above the sinus, rarely connivent at the sinus, never connivent or united below sinus. **Indument** of hamate or acicular trichomes, the latter sometimes septate. **Sori** round to less often oblong or elongate along the veins, indusiate to exindusiate; sporangia glabrous or rarely setose. **Spores** with a usually finely reticulate perispore. $x = 29$.

Subgenus *Amauropelta* comprises over 200 tropical American species, with one species in Hawaii and a few in Africa, Madagascar, and the Mascarene Islands. It has been subdivided by Smith (1974) into nine sections, based on the following characters: stem habit; the type and distribution of trichomes and glands; and the presence or absence of costal scales, aerophores, and indusia.

The number of new taxa (13 species) is somewhat surprising, especially since the Ecuadorian species have recently been treated (Smith, 1983). Less overlap was encountered between the species of Peru and Ecuador than was expected, with 30 of 47 species of the subgenus in Peru also occurring in Ecuador and 30 of 60 found in Ecuador also in Peru. In general, in subg. *Amauropelta* there are a number of very widespread species, often occurring from southern Mexico to Bolivia, and an equal number of highly restricted and poorly known species. Thirteen species are known thus far only from Peru.

Of the Peruvian species, the most difficult group is sect. *Lepidoneuron*, comprising those species with dark scales along the abaxial costae. This group is in need of monographic revision, and difficulty may be encountered in species identification.

References

- CHRISTENSEN, C. 1907. Revision of the American species of *Dryopteris* of the group of *D. opposita*. Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 4: 249–336.
- SMITH, A. R. 1974. A revised classification of *Thelypteris* subgenus *Amauropelta*. *Amer. Fern J.* 64: 83–95.

Key to Species of subg. *Amauropelta*

- a. Trichomes fasciculate on costae and rachis abaxially, appearing stellate; prominent peglike or scalelike aerophores up to 5 mm long at base of costae and smaller ones at base of costules b
 - b. Scales scattered, dark brown on costae abaxially 20. **T. phacelothrix**
 - b. Scales absent on costae abaxially or if present, tan c
 - c. Lamina abaxially with red to yellow sessile glands 19. **T. thomsonii**
 - c. Lamina abaxially lacking glands 18. **T. canadasii**
 - a. Trichomes not fasciculate (evenly spaced, not appearing stellate) or absent; aerophores present or absent at base of costae, absent at base of costules d
 - d. Lamina abaxially with hamate trichomes on tissue and/or axes; adaxial surfaces between veins bearing numerous appressed trichomes ca. 0.1–0.2 mm; lamina eglandular abaxially e
 - e. Pinnae entire or nearly so, the largest 0.5–1.5 cm long; buds present in axils of distal pinnae 10. **T. pusilla**
 - e. Pinnae shallowly to deeply lobed or pinnatifid, largest ones greater than 1.5 cm long; buds absent (except *T. linkiana*) f
 - f. Costae abaxially with persistent, spreading or ascending, castaneous or blackish scales g
 - g. Rachis abaxially with numerous, persistent, spreading scales 3–5 mm long 12. **T. leoniae**
 - g. Rachis abaxially lacking persistent scales, or scales sparse, not noticeably spreading .. h
 - h. Sori indusiate, indusium setose 34. **T. hutchisonii**
 - h. Sori exindusiate, receptacle occasionally setose 28. **T. rudis**
 - f. Costae abaxially lacking persistent scales, if scales present then appressed, dull, light tan i
 - i. Sori round, indusiate (look carefully in mature sori!) j
 - j. Proximal pinnae gradually reduced, reduced pinnae numerous, ca. 7–11 pairs; sori medial 6. **T. scalaris**
 - j. Proximal pinnae abruptly reduced, 6 pairs or fewer; sori supramedial to inframarginal k
 - k. Glands numerous, short-stipitate (0.05–0.1 mm), present on costae, veins, and lamina abaxially; indusia glandular 9. **T. ptarmiciformis**
 - k. Glands sparse or absent abaxially; indusia setose 5. **T. oligocarpa**
 - i. Sori round to oblong or elongate, exindusiate l
 - l. Pinnae less than 3(–5) cm long; buds lacking m
 - m. Sori oblong or elongate along the veins; proximal reduced pinnae 1 or 2 pairs, these $\frac{1}{3}$ – $\frac{1}{2}$ the length of the longest pinnae 2. **T. aspidioides**
 - m. Sori round or slightly oblong; proximal reduced pinnae 3 or more pairs, the smallest often less than $\frac{1}{10}$ the length of the longest pinnae n
 - n. Aerophores peglike at pinna bases; abaxial costal trichomes 0.2–0.3 mm long; petiole base and stem apex scales numerous, shining, with numerous stiff setae on margin and surface 11. **T. brachypus**
 - n. Aerophores absent; abaxial costal trichomes mostly 0.3–0.5 mm long; petiole base and stem apex scales sparse, dull, sparsely and laxly ciliate 7. **T. andicola**
 - l. Pinnae more than 5 cm long; buds lacking or present in axils of distal pinnae ... o
 - o. Sori round; sporangia setose; buds lacking 4. **T. longipilosa**
 - o. Sori elongate 1.5–3 mm along veins; sporangia usually glabrous; bud(s) in axil(s) of distal pinnae 3. **T. linkiana**
- d. Lamina abaxially with acicular trichomes or glabrous; adaxial surfaces glabrous or pubescent, trichomes appressed or not; lamina glandular or eglandular abaxially p
 - p. Indusia present q
 - q. Lamina abaxially between the veins with sessile, reddish, orangish, or yellowish resinous, hemispherical glands, these often also on indusia r
 - r. Sori supramedial to inframarginal, partially covered by the strongly inrolled segment margin; veins abaxially sunken and often darkened in dried specimens; young croziers mucilaginous; aerophores peglike or scalelike at pinna bases ... 43. **T. cheilanthoides**

- r. Sori medial to supramedial, not hidden by the segment margin; veins abaxially flush or slightly raised; young croziers usually not mucilaginous; aerophores absent or peglike 5
- s. Fronds 8–20 × 1.5–2.5 cm; lamina adaxially with dense trichomes 0.1–0.2 mm; texture thin 41. **T. micula**
- s. Fronds larger than 20 × 2.5 cm; lamina adaxially glabrous or with sparse to moderately dense trichomes; texture chartaceous to subcoriaceous t
- t. Costae abaxially with scattered, dark, ovate-lanceolate scales to 1 mm and ascending unicellular trichomes mostly 0.2 mm; petiole 1–1.3 mm in diameter ... 42. **T. dudleyi**
- t. Costae abaxially lacking scales, or scales if present tan to stramineous, trichomes spreading, unicellular or septate, 0.2–2.0 mm; petiole 1–10 mm in diameter ... u
- u. Costae with amorphous, mostly appressed scales; indusia ca. 1 mm in diameter 38. **T. pachyrhachis**
- u. Costae lacking scales; indusia ca. 0.5–0.7 mm in diameter v
- v. Segments short-oblong to deltate; segment margins strongly revolute; texture chartaceous to subcoriaceous; aerophores absent or weakly developed; trichomes of abaxial costae unicellular; veins fewer than 8 pairs per segment 40. **T. opposita**
- v. Segments linear-oblong; segment margins slightly revolute to planar; texture chartaceous; aerophores tuberculiform or peglike; trichomes of abaxial costae sometimes septate; veins 10–16 pairs per segment 39. **T. balbisii**
- q. Lamina abaxially between the veins lacking sessile glands, or if glands present then these short-stipitate, light yellowish, or if reddish then confined to costae and veins w
- w. Petiole and often rachis atropurpureous, shining, glabrous x
- x. Pinnae 3–8 cm, widest at the base; texture chartaceous to subcoriaceous 13. **T. furva**
- x. Pinnae to 18 cm, slightly narrowed at the base (proximal segments slightly shortened); texture thin-chartaceous 24. **T. atrorubens**
- w. Petiole and rachis stramineous to tan or dull brownish, often pubescent y
- y. Trichomes of costae and laminar tissue abaxially dense, uniformly short (0.10–0.15 mm); lamina adaxially with short appressed trichomes; indusium reduced to a few cells and less than 0.1 mm in diameter, bearing a tuft of short trichomes 8. **T. enigmatica**
- y. Trichomes of costae and laminar tissue abaxially sparse to dense, commonly longer (0.2–1.0 mm); lamina adaxially (between veins) glabrous or with sparse trichomes; indusium at least 0.2 mm in diameter, glabrous or pubescent z
- z. Costae abaxially with ovate to lanceolate or amorphous scales; segment margins strongly inrolled or not; aerophores peglike or scalelike at pinna bases aa
- aa. Segment margins neither strongly inrolled nor covering sori 38. **T. pachyrhachis**
- aa. Segment margins strongly inrolled and partially covering sori bb
- bb. Costal scales numerous, bicolorous, the center dark brown, margins pale 44. **T. furfuracea**
- bb. Costal scales sparse to moderately dense, concolorous, stramineous to tan 43. **T. cheilanthoides**
- z. Costae abaxially lacking scales; segment margins planar or weakly inrolled, not or slightly covering sori; aerophores lacking cc
- cc. Indusia with sparse to dense, long silky trichomes up to ca. 1 mm 16. **T. glandulosolanosa**
- cc. Indusia lacking trichomes or if present then usually stiff, not dense, less than 0.4 mm dd
- dd. Costal trichomes mostly (0.3–)0.5–1.5 mm; costules and veins adaxially with similar stout trichomes; indusia stipitate-glandular on margin, otherwise glabrous; petiole bases with at least a few, persistent, spreading, lanceolate scales; sporangia glabrous 14. **T. pilosula**

- dd. Costal trichomes mostly less than 0.5 mm, usually less than 0.3 mm; costules and veins adaxially glabrous or with sparse trichomes 0.2 mm long; indusia eglandular, short-pubescent; petiole bases lacking scales or scales few, ovate-lanceolate; sporangia often setose 15. **T. rufa**
- p. Indusia absent ee
- ee. Sporangia minutely setulose, with trichomes less than 0.1 mm from capsule ff
- ff. Costal trichomes mostly 0.1–0.6 mm; costae abaxially with scattered linear-lanceolate scales; receptacular trichomes 0.1–0.5 mm gg
- gg. Trichomes of rachis abaxially strongly deflexed and appressed, 0.2 mm long; costal trichomes abaxially 0.1–0.2 mm 23. **T. comptula**
- gg. Trichomes of rachis abaxially patent, mostly more than 0.3 mm long; costal trichomes abaxially mostly 0.3–0.6 mm 22. **T. peruviana**
- ff. Costal trichomes 0.1 mm or less; costae abaxially without scales; receptacular trichomes absent, or if present less than 0.1 mm hh
- hh. Pinnae incised within 0.5 mm of costae; segments oblique; lamina abaxially with sessile resinous glands 36. **T. lorentensis**
- hh. Pinnae incised to 0.5–1 mm from costae; segments spreading to suboblique; lamina glandless 35. **T. concinna**
- ee. Sporangia glabrous ii
- ii. Scales lacking on costae abaxially jj
- jj. Costae and lamina abaxially with dense, short trichomes 0.1–0.15 mm 8. **T. enigmatica**
- jj. Costae and lamina abaxially glabrous or sparsely to moderately pubescent, the trichomes 0.15 mm or more kk
- kk. Aerophores at pinna bases peglike; reduced proximal pinnae commonly 5 or more pairs ll
- ll. Petiole and often rachis atropurpureous; costae abaxially moderately pubescent 21. **T. pavoniana**
- ll. Petiole and rachis tan to stramineous; costae abaxially glabrous or nearly so 47. **T. proboscidea**
- kk. Aerophores lacking or tuberculiform; reduced proximal pinnae 2–4 pairs mm
- mm. Costae moderately pubescent abaxially 17. **T. demissa**
- mm. Costae glabrous or nearly so abaxially 37. **T. deflexa**
- ii. Scales present on costae abaxially nn
- nn. Costal trichomes spreading, pluricellular, often over 1 mm; aerophores lacking or weakly developed; costal scales stramineous to tan, with lateral walls not easily visible, scales not clathrate oo
- oo. Segment margin inrolled and partially covering the sori; sori confluent at maturity 45. **T. ruiziana**
- oo. Segment margin not or weakly inrolled, not covering sori; sori not confluent at maturity 46. **T. nitens**
- nn. Costal trichomes spreading to antrorse, unicellular, 0.1 to occasionally more than 1 mm, or trichomes lacking; aerophores present or absent; costal scales tan to brown, often with lateral walls darker than surficial walls (scales clathrate or sub-clathrate) pp
- pp. Costal scales tan; aerophores peglike, 1–3 mm; costae and rachis glabrous or very sparsely pubescent 47. **T. proboscidea**
- pp. Costal scales brown or darker; aerophores absent or tuberculiform, if peglike less than 1 mm; costae and rachis glabrous to densely pubescent qq
- qq. Lamina 2-pinnate proximally, the pinnules constricted at their base; costae glabrous or sparsely pubescent abaxially 27. **T. pterioidea**
- qq. Lamina 1-pinnate-pinnatifid proximally, the pinnules connected by a narrow to broad wing; costae glabrous to densely pubescent abaxially rr
- rr. Costae and rachis abaxially completely lacking trichomes ss

- ss. Petiole and rachis atropurpureous, shining 25. *T. laevigata*
- ss. Petiole and rachis stramineous to tan, dull 26. *T. euchlora*
- rr. Costae and rachis abaxially with at least a few trichomes tt
- tt. Lamina relatively small, pinnae mostly less than 5 cm long and 1.5 cm wide; reduced proximal pinnae 1–3(–4) pairs 33. *T. caucaensis*
- tt. Lamina usually large, pinnae greater than (5–)10 cm long and 1.5 cm wide; reduced proximal pinnae more than 3 pairs (look for glanduliform pinnae at base of lamina!) uu
- uu. Costal scales decidedly clathrate, the lateral walls black and lumina clear; costules and veins adaxially with stout hispid trichomes 1 mm long or more 31. *T. corazonensis*
- uu. Costal scales weakly clathrate or uniformly colored; costules and veins adaxially glabrous or with short trichomes less than 0.5 mm vv
- vv. Trichomes on costae abaxially scattered, relatively few; lamina and veins abaxially glabrous or nearly so 32. *T. brausei*
- vv. Trichomes on costae abaxially dense or moderately so, relatively numerous; lamina glabrous or pubescent abaxially ww
- ww. Costae abaxially with antrorse trichomes; lamina abaxially between veins with a few hamate trichomes below sinuses; proximal pinnae abruptly reduced with many glanduliform pinnae 28. *T. rudis*
- ww. Costae abaxially with trichomes mostly spreading; lamina abaxially between veins glabrous or pubescent with straight trichomes; proximal pinnae gradually to abruptly reduced, with or without glanduliform pinnae xx
- xx. Trichomes of rachis dense, usually slightly reflexed; costal trichomes abaxially mostly 0.2–0.4 mm; veins with short trichomes 0.1–0.3 mm adaxially 29. *T. supina*
- xx. Trichomes on rachis of moderate density, spreading; costal trichomes abaxially mostly 0.5–1 mm; veins glabrous or with trichomes mostly 0.4–1 mm adaxially 30. *T. pilosohispida*

2. *Thelypteris aspidioides* (Willd.) R. Tryon, *Rhodora* 69: 5. 1967.

Ceterach aspidioides Willd., *Sp. pl.* ed. 4. 5: 137. 1810.

TYPE: Venezuela, Caracas, *Bredemeyer* (holotype, B, *Herb. Willd.* 1958 I; microfiche, UC).

Dryopteris aspidioides (Willd.) C. Chr., *Index fil.* 253. 1905.

Dryopteris aspidioides var. *subhastata* C. Chr., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 4: 287.* 1907. LECTOTYPE (chosen here): Peru, (San Martín), prope Tarapoto, *Spruce* 3964 (B; isolectotypes, BM!, C, G!, GH!, NY!, US!).

Stem ascending to erect, scales brown, dull, ovate-lanceolate to lanceolate, setose on margins

and surfaces. **Leaves** numerous, clustered, 14–30 cm long. **Lamina** chartaceous, 1-pinnate to 1-pinnate-pinnatifid, proximal 1 or 2 pairs of pinnae somewhat reduced, the lowermost 1–2.5 cm long. **Petiole** 2–9 cm × 0.7–1.5 mm, brownish to tan above the base, often with scattered, persistent scales. **Rachis** glabrescent to hamate-pubescent abaxially. **Pinnae** short-stalked to 1 mm, 2–5 × 0.4–0.8 cm, entire, crenate, or shallowly incised ca. halfway to costa, often subauriculate at base, especially acroscopically. **Aerophores** absent or peglike to 0.3 mm. **Buds** lacking. **Veins** 2–4 pairs per segment. **Indument** on costae, veins, and laminar tissue abaxially of moderately dense, spread-

ing, mostly hamate trichomes 0.1–0.3 mm, glands lacking, costal scales lacking, lamina adaxially glabrescent or with numerous adpressed acicular trichomes ca. 0.2 mm on costules, veins, and laminar tissue. **Sori** medial to supramedial, oblong to elongate along the veins, exindusiate, receptacle glabrous, sporangia glabrous.

Along streams and in stream beds, especially on wet rocks, 200–1900 m, San Martín, Loreto, Pasco, Madre de Dios, and Puno.

Costa Rica and Panama; Colombia to Bolivia; Venezuela.

San Martín: San Roque, *Ll. Williams 7758* (F). Tarapoto, ca. 15 km from Tarapoto along road to Yurimaguas, *Martin & Plowman 1814* (F, GH). Tarapoto–Yurimaguas Hwy, Km 14–17, *McDaniel 13811* (GH, USM). Chazuta, Río Huallaga, *Klug 4085* (BM, F, GH, MO, NY, UC). Pongo de Cainarachi, Río Cainarachi, tributary of Río Huallaga, *Klug 2658* (BM, F, G, GH, K, MO, NY). Prov. San Martín, Dist. Tarapoto, Carretera Tarapoto–Yurimaguas, Km 12–15, *Hickok 635* (GH). 17 km NE of Tarapoto on road to Yurimaguas, *Gentry et al. 37866* (MO, UC, USM). **Loreto:** Pongo de Chilcayo, Tarapoto, *Ule 6518* (G). **Pasco:** Pichis Trail, Porvenir (as Junín), *Killip & Smith 25958* (NY). **Madre de Dios:** Prov. Manú, Cerro de Pantiacolla, Río Palotoa, 10–15 km NNW of Shintuya, *R. Foster et al. 10712* (F, USM). **Puno:** San Gabán (as St. Gavan), *Lechler 2311* (B).

3. *Thelypteris linkiana* (Presl) R. Tryon, *Rhodora* 69: 6. 1967.

Gymnogramma diplazioides Desv., *Mém. Soc. Linn. Paris* 6: 214. 1827. TYPE: Hispaniola, collector unknown (holotype, ♀, *Herb. Desvaux*).

Gymnogramma polypodioides Link, *Hort. Berol.* 2: 1833, not Sprengel, 1827. TYPE: Cultivated specimen, said to be from Brazil, probably erroneously (holotype, ♀?).

Grammitis linkiana Presl, *Tent. pterid.* 209. 1836, *nom. nov.* for *Gymnogramma polypodioides* Link.

Dryopteris diplazioides (Desv.) Urban, *Symb. antill.* 4: 21. 1903.

Dryopteris linkiana (Presl) Maxon, *J. Wash. Acad. Sci.* 14: 199. 1924.

Thelypteris diplazioides (Desv.) Proctor, *Bull. Inst. Jamaica, Sci. Ser.* 5: 59. 1953, not Ching, 1936.

Amauropelta diplazioides (Desv.) Pic.-Ser., *Webbia* 31: 251. 1977.

Stem ascending to usually erect, apical scales light brown, dull, ovate-lanceolate, glabrescent or setulose on margins and surface. **Leaves** few, clustered, 50–100(–140) cm long. **Lamina** herbaceous, 1-pinnate-pinnatifid, proximal 2–5 pairs of pinnae gradually to subabruptly reduced, the lowermost 5–15 mm long, never glanduliform. **Petiole** 12–25 cm × 1.5–4 mm, brownish to tan above the base,

with scattered, appressed scales at base. **Rachis** glabrescent or with hamate trichomes 0.2–0.3 mm abaxially. **Pinnae** sessile, 5–15 × 1.2–2.6 cm, pinnatifid to 2–4 mm from costae, segments 3–6 mm wide. **Aerophores** tuberculiform or peglike to 0.5 mm. **Buds** commonly present in axils of distal pinnae. **Veins** 5–10 pairs per segment. **Indument** on costae, veins, and sometimes laminar tissue abaxially of sparse to moderately dense, spreading, hamate trichomes mostly 0.15–0.3 mm, or laminar tissue glabrous, glands lacking, costal scales lacking or a few appressed linear tan scales present, lamina adaxially with numerous adpressed acicular trichomes 0.1–0.2 mm on costules, veins, and laminar tissue. **Sori** medial to supramedial, oblong to commonly elongate 2–3 mm along veins, exindusiate, receptacle glabrous, sporangia glabrous or rarely setose.

In montane forests, slopes and ravines, 500–2200 m, San Martín, Huánuco, Junín, Ayacucho, and Cuzco.

West Indies; Southern Mexico to Panama; Colombia to Bolivia; Guyana; Venezuela.

San Martín: Mt. Campana, near Tarapoto, *Spruce 4084* (GH). **Huánuco:** Prov. Huánuco, Dist. Churubamba, Hda. Exito, N slope of Río Cayumba, *Mexia 8112* (BH, F, US). **Junín:** Chanchamayo Valley, *C. Schunke 16* (F), *51* (F, US), *56a* (F), *60* (F, US), *509* (F), *936*, (F), *937* (F), *939* (F), *952*, (F), *1352* (F). **Ayacucho:** Ayna, between Huanta and Río Apurímac, *Killip & Smith 22726* (NY, US). **Cuzco:** Prov. Paucartambo, Kosñipata, Pilcopata-Santa Inés, *Vargas 11314* (GH).

4. *Thelypteris longipilosa* (Sodirol) Reed, *Phytologia* 17: 290. 1968.

Nephrodium longipilosum Sodirol, *Anales Univ. Centr. Ecuador* 23(160): 103. 1908 [Sert. Fl. Ecuad., Ser. II. 26]. TYPE: Ecuador, Volcán Corazón, Dec 1907, *Sodirol* (isotype, ♀, frag. and photos, US).

Stem ascending to erect, scales brown, somewhat shiny, lanceolate, setose on margins and surface. **Leaves** few, clustered, 30–90 cm long. **Lamina** thick-herbaceous, 1-pinnate-pinnatifid, proximal 4–6 pairs of pinnae gradually reduced, the lowermost ca. 10 mm long, not glanduliform. **Petiole** 4–8(–15) cm × 2–3 mm, brownish to tan above the base, with spreading scales to 1 cm. **Rachis** with dense, short trichomes 0.1–0.2 mm mixed with long, stout trichomes 1–1.5 mm abaxially, with hyaline to slightly reddish trichomes adaxially. **Pinnae** sessile, 5–10 × 1.2–2 cm, pinnatifid to ca. 1.5–3 mm from costae, segments 3–

4 mm wide. **Aerophores** tuberculiform. **Buds** lacking. **Veins** 4–8 pairs per segment, lowermost pairs running to sinus. **Indument** on costae abaxially a mixture of dense, short trichomes 0.1–0.2 mm and long, stout trichomes 1–2 mm, veins and laminar tissue with dense, erect, hamate trichomes 0.2–0.3 mm, glands lacking, costal scales lacking, lamina adaxially with numerous adpressed acicular trichomes 0.2–0.3 mm on costules, veins, and laminar tissue, also with scattered stout spreading or ascending setae on costules and veins. **Sori** medial, round to slightly oblong, exindusiate, receptacle glabrous or very sparsely setose, sporangia with numerous setae 0.1–0.2 mm long on capsule.

In cloud forest, 2300–2500 m, rare in Peru: Pasco.

Costa Rica and Panama; Colombia to Peru.

Pasco: Prov. Oxapampa, San Alberto, Cordillera de Yanachuga, *van der Werff et al.* 8440 (MO).

5. ***Thelypteris oligocarpa*** (Willd.) Ching, Bull. Fan Mem. Inst. Biol., Bot. 10: 253. 1941.

Polypodium oligocarpum Willd., Sp. pl. ed. 4, 5: 201. 1810. TYPE: Venezuela, Caracas, *Humboldt* (holotype, B, *Herb. Willd.* 19699, in part; microfiche, UC).

Dryopteris oligocarpa (Willd.) Kuntze, Rev. gen. pl. 3: 378. 1898.

Aspidium navarrense Christ, Bull. Herb. Boissier, II, 6: 160. 1906. TYPE: Costa Rica, Navarro, *Wercklé* (holotype, P).

Dryopteris columbiana C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 4: 279. 1907. TYPE: Colombia, Santa Marta, *H. H. Smith* 998 (holotype, P; isotypes, MICH!, UC!, US!).

Dryopteris lomatosora Copel., Univ. Calif. Publ. Bot. 19: 298. 1941. TYPE: Peru, Huánuco, Prov. Huánuco, Dist. Churubamba, Hda. Mercedes, Poca Perga, *Mexia* 8187 (holotype, UC!; isotypes, F!, GH!, MO!, US!).

Thelypteris lomatosora (Copel.) Reed, Phytologia 17: 288. 1968.

Amauropelta oligocarpa (Willd.) Pic.-Ser., Webbia 31: 251. 1977.

Stem ascending to erect, scales dark brown, dull to somewhat shiny, lanceolate, setose on margins and surface. **Leaves** several, clustered, 30–75(–110) cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal 3–6 pairs of pinnae abruptly reduced, the lowermost 1–3 mm long, not glanduliform, sometimes hastate. **Petiole** 4–15 cm × 1–3 mm, brownish and scaleless above the base. **Rachis** with dense, spreading trichomes 0.1–1 mm abaxially, sometimes with septate trichomes to 2 mm. **Pin-**

nae sessile, 4–11(–14) × 1–2(–2.6) cm, deeply pinnatifid to within 1 mm of costae, segments 2–3 mm wide. **Aerophores** lacking. **Buds** lacking. **Veins** 6–10 pairs per segment. **Indument** on costae, veins, and often laminar tissue abaxially of dense, spreading, acicular trichomes 0.1–1 mm, long and short trichomes often intermixed on costae, sometimes also with septate trichomes to 1.5 mm on costae and hamate trichomes 0.2–0.5 mm on laminar tissue, glands lacking, costal scales lacking, lamina adaxially with scattered, stout, ascending, acicular trichomes 0.5–1 mm on costules and veins, and adpressed trichomes 0.1–0.2 mm on laminar tissue. **Sori** supramedial to inframarginal, round, indusia 0.2–0.3 mm wide with setae 0.2–0.3 mm, receptacle and sporangia glabrous.

In montane forests and ravines, road banks, often in recently cleared areas or in secondary growth, 800–2450 m, Lambayeque, San Martín, Huánuco, Junín, Ayacucho, and Cuzco.

Greater Antilles; Mexico to Panama; Colombia to Bolivia; Venezuela; southern Brazil, northwestern Argentina.

The best characters for distinguishing the species are the often inframarginal sori with short-setose indusia, few pairs of abruptly reduced proximal pinnae, spreading, lanceolate petiole base scales, and the mixture of long, stout trichomes on the adaxial costules and veins and more numerous short, appressed trichomes on the laminar tissue.

Thelypteris navarrensis (Christ) Proctor, treated here as a synonym, differs primarily in having very long, septate trichomes on the costae and rachis abaxially. This variant seems to be common in southern Central America and the Andes, although perhaps absent elsewhere. Typical *T. oligocarpa* has a mixture of long and short, nonseptate trichomes.

Lambayeque: 42 km from Olmos on road to Jaén, *Correll & Smith* P818 (GH). **San Martín:** Mt. Guayrapurina, near Tarapoto, *Spruce* 4015 (BM, w). **Huánuco:** Along hwy between Huánuco and Tingo María, at Río Tulca, vicinity of Km 443.5, 6 km N of Acomayo, *Croat* 57852 (MO). **Junín:** La Merced–Chanchamayo, *Soukup* 1055 (F). **Ayacucho:** Prov. La Mar, between Tambo San Miguel, Ayna and Hda. Luisiana, *Dudley* 11885 (GH). **Cuzco:** Prov. Urubamba, Dist. Machu Picchu, just before Machu Picchu Station, *Saunders* 1231 (F, GH).

6. ***Thelypteris scalaris*** (Christ) Alston, J. Wash. Acad. Sci. 48: 234. 1958.

Aspidium scalare Christ, Bull. Herb. Boissier, II, 6: 159. 1906. LECTOTYPE (chosen by Christen-

sen, 1907, p. 323): Guatemala, Alta Verapaz, Cubilquitz, von *Tuerckheim* (us!; isolectotype, us!). *Dryopteris scalaris* (Christ) C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 4: 323. 1907.

Stem ascending to erect, scales brown, dull to somewhat shiny, lanceolate, setose on margins and surface. **Leaves** several, clustered, 50–180 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal ca. 7–11 pairs of pinnae gradually reduced, the lowermost 5 mm long or less, sometimes glanduliform. **Petiole** to 25 cm × 3 mm, tan to stramineous and lacking scales above the base. **Rachis** with moderately dense, spreading trichomes mostly 0.2–0.4 mm abaxially. **Pinnae** sessile, 5–12 × 1.1–2.6 cm, deeply pinnatifid to within 1 mm of costae, segments 2–4 mm wide. **Aerophores** lacking or nearly so. **Buds** lacking or occasionally present. **Veins** 8–16 pairs per segment. **Indument** on costae, veins, and laminar tissue abaxially of sparse to moderately dense, mostly hamate trichomes mostly 0.2–0.3 mm, glands lacking, costal scales lacking, lamina adaxially with numerous adpressed trichomes 0.1–0.2 mm on costules, veins, and laminar tissue. **Sori** supramedial to inframarginal, round, indusia with acicular and hamate trichomes 0.1–0.3 mm, receptacle and sporangia glabrous.

Edges of streams and on floating mat of lacustrine vegetation, 2000–2500 m, Cajamarca and Amazonas.

Southern Mexico to Panama; Colombia to Peru; Venezuela.

Cajamarca: Prov. Contumazá, La Pampa (Guzman-go), *Sagástegui & Sagástegui 14123* (UC). **Amazonas:** Prov. Bongará, Pomacocha, *D. Smith 6034* (MO).

7. *Thelypteris andicola* A. R. Sm., *sp. nov.*

A speciebus ceteris subg. *Amauropeltae* distinguenda paleis paucis ciliatis ad basin petiolorum, pinnis plerumque 1–4 cm longis, basi aerophoris destitutis, segmentis venis 2–6-jugis institutis, soris exindusiatis, et praesertim trichomatibus numerosis erectis hamatis 0.3–0.5 mm ad costas et venas et inter venis abaxialiter dispositis.

Stem ascending to erect, scales brown, dull, ovate to ovate-lanceolate, ciliate. **Leaves** numerous, densely clustered, 8–35(–55) cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal 5–10 pairs of pinnae gradually reduced, the lowermost 1–4 mm long. **Petiole** 1–15 cm × 0.7–1.5(–3) mm,

tan to stramineous above the base. **Rachis** nearly glabrous abaxially. **Pinnae** sessile, 1–4 × 0.5–1.1 cm, incised ca. 0.4–0.7 mm from costa. **Aerophores** lacking. **Buds** lacking. **Veins** 2–6 pairs per segment. **Indument** on costae, veins, and laminar tissue abaxially of moderately dense, spreading, mostly hamate trichomes 0.3–0.5 mm, glands lacking, costal scales lacking, lamina adaxially with scattered ascending, acicular trichomes 0.2–0.3 mm on costules and veins, laminar tissue glabrous. **Sori** medial, round, exindusiate, receptacle glabrous, sporangia glabrous.

TYPE—Peru, Huánuco, Chavenillo, *Woytkowski 1029* (holotype, UC!).

On damp banks and moist rocks, 2400–3900 m, La Libertad, Huánuco, and Cuzco.

Known only from Peru.

La Libertad: Prov. Santiago de Chuco, Dist. Quiruvilca, about halfway from Motil to Shorey, *Saunders 888* (F, GH). Prov. and Dist. Otuzco, near Chaullacocha, on Trujillo–Otuzco road, *Saunders 901* (F, GH). **Cuzco:** Prov. Paucartambo, Km 130 hacia Kosñipata, Parque Nacional del Manú, *Núñez et al. 8528* (MO, UC).

8. *Thelypteris enigmatica* A. R. Sm., *sp. nov.*

A speciebus ceteris subg. *Amauropeltae* distinguenda caule erecto, soris rotundatis trichomatibus caespitosis 0.1–0.2 mm longis in receptaculo vel in indusio minuto, sporangiis glabris, laminis adaxialiter trichomatibus 0.1 mm longis numerosis appressis, et praesertim costis et venis et spacio inter venas abaxialiter dense puberulis et trichomatibus erectis acicularibus 0.1–0.15 mm longis.

Stem erect, scales dark brown, somewhat shiny, lanceolate, setulose on margins and surface. **Leaves** few, clustered, ca. 75 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal ca. 8–10 pairs of pinnae subabruptly reduced, the lowermost 2 mm long or less, sometimes glanduliform. **Petiole** ca. 10 cm × 2–4 mm, brownish above the base, with scattered, spreading scales. **Rachis** with dense, acicular trichomes abaxially. **Pinnae** sessile, the largest 8–10 × 1.5 cm, deeply pinnatifid to within 1 mm of costae. **Aerophores** tuberculiform. **Buds** lacking. **Veins** 8–10 pairs per segment. **Indument** on costae, veins, and laminar tissue abaxially of dense, spreading, acicular trichomes 0.1–0.15 mm, glands lacking, costal scales lacking, lamina adaxially with numerous ascending to adpressed acicular trichomes 0.1–0.15 mm on costules, veins, and laminar tissue. **Sori** medial to supramedial, round, exindusiate or indusia reduced to a few cells

and less than 0.1 mm long, receptacle (or indusial fragment) with a dense tuft of trichomes 0.1–0.2 mm, sporangia glabrous.

TYPE—Peru, San Martín, Prov. Rioja, Pedro Ruiz–Moyobamba road, Km 390, Venceremos, *D. Smith & Vásquez 4594* (holotype, uc!; isotype, MO!).

Montane rain forest, 2040 m, San Martín.

Known only from the type.

The relationships of this species are unclear, hence the species epithet. In aspect and in the adpressed trichomes on the lamina adaxially, it resembles *T. oligocarpa*, but *T. enigmatica* lacks uncinately trichomes. The pubescence on all parts of the plant is uniformly short, 0.15 mm or less, much as in *T. concinna*. There is a tuft of trichomes from the receptacle or from a very reduced indusium.

9. *Thelypteris ptarmiciformis* (Rosenst.) Reed, *Phytologia* 17: 307. 1968.

Dryopteris ptarmiciformis Rosenst., *Repert. Spec. Nov. Regni Veg.* 12: 472. 1913. TYPE: Bolivia, Pologolo, *Buchtien 3435* (isotype, uc!).

Stem short-creeping to ascending, scales brown, somewhat shiny or dull, lanceolate, glabrescent or setose on margins and surface. **Leaves** few, clustered, (25–)40–70 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal 2–4 pairs of pinnae abruptly reduced, the lowermost 1–5 mm long, not glanduliform. **Petiole** 7–20 cm × 1.5–3 mm, tan to stramineous and lacking scales above the base. **Rachis** glabrescent or with numerous unicellular or septate trichomes abaxially, often with short-stipitate glands 0.05 mm. **Pinnae** sessile, 3.5–10 × 1.0–1.8 cm, deeply pinnatifid to within 1 mm of costae, segments 2–3 mm wide, rather oblique and subfalcate. **Aerophores** absent. **Buds** lacking. **Veins** 5–12 pairs per segment. **Indument** on costae, veins, and laminar tissue abaxially of numerous short-stipitate glands 0.05–0.1 mm, sometimes also with unicellular (mostly ca. 0.1 mm) and septate (1–2 mm) trichomes, laminar tissue also with a few hamate trichomes 0.1 mm, costal scales lacking, lamina adaxially glabrescent or with ascending to adpressed trichomes 0.1–0.5 mm on costules, veins, and laminar tissue, also with short-stipitate glands. **Sori** supramedial to inframarginal, round, indusia with numerous short-stipitate glands and sometimes sparse trichomes, receptacle glabrous, sporangia glabrous.

Montane rain forests, 500–2250 m, Cuzco and Puno.

Peru; Bolivia; southern Brazil.

This is very closely related to *T. oligocarpa* and may eventually prove to be only a variant of that species. One of the specimens cited (*Vargas 16440*) bears septate trichomes to 2 mm mixed with short unicellular trichomes 0.1 mm on the abaxial rachis and costae; the other specimen is very sparsely pubescent and lacks septate trichomes. Both have abundant short-stipitate laminar glands and a few minute hamate trichomes on the lamina, thus agreeing with the isotype seen.

Cuzco: Prov. Quispicanchi, vicinity of Inambari, *Vargas 16440* (GH). Puno: Prov. Sandia, vicinity of Sandia, *Vargas 14810* (GH).

10. *Thelypteris pusilla* (Mett.) Ching, *Bull. Fan Mem. Inst. Biol., Bot.* 10: 254. 1941.

Aspidium pusillum Mett., *Ann. Sci. Nat. Bot.*, V, 2: 245. 1864. TYPE: Colombia, Fusagasuga, *Lindig 92* (holotype, B).

Dryopteris pusilla (Mett.) Kuntze, *Rev. gen. pl.* 2: 813. 1891.

Stem ascending, scales brown, somewhat shiny, lanceolate, densely setose on margins and surface. **Leaves** numerous, arching, clustered, up to 20 cm long. **Lamina** thin-herbaceous, 1-pinnate, proximal 2–5 pairs of pinnae gradually reduced, the lowermost 1–2.5 mm long. **Petiole** 1–7 cm × 0.4–0.7 mm, stramineous above the base. **Rachis** with hamate trichomes 0.2–0.3 mm abaxially. **Pinnae** sessile, mostly 0.5–1.5 × 0.3–0.6 cm, entire or faintly crenulate, sometimes slightly auriculate or hastate at base. **Aerophores** lacking. **Buds** or small plantlets arising from axils of distal pinnae. **Veins** up to 7 pairs per pinna, only proximal pair 1-forked. **Indument** on costae, veins, and laminar tissue abaxially of moderately dense, spreading, hamate trichomes 0.15–0.3 mm, glands lacking, costal scales lacking, lamina adaxially with numerous adpressed acicular trichomes 0.2–0.3 mm. **Sori** medial to supramedial, round, indusia round-reniform, 0.6–1 mm wide, faintly greenish and bearing numerous hamate trichomes, receptacle glabrous, sporangia glabrous.

On rock walls, 2560 m, rare in Peru: Cuzco.

Costa Rica; Colombia and Venezuela to Bolivia.

This species is one of the smallest in the genus and usually has fronds arching and rooting from buds produced near the distal part of the rachis.

Cuzco: Urubamba, Machu Picchu, above Río Mando, 4 km from Km 114 of Urubamba railroad, *Peyton & Peyton 1313* (MO).

11. *Thelypteris brachypus* (Sodirol) R. & A. Tryon, *Rhodora* 84: 128. 1982.

Nephrodium brachypus Sodirol, *Recens. crypt. vasc. Quit.* 43. 1883. TYPE: Ecuador, Prov. Bolívar, "bosques del Chimborazo cerca del pueblo de Chillanes," *Sodirol* (possible isotype, uc!).

Dryopteris brachypus (Sodirol) C. Chr., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7,* 10: 135. 1913.

Stem ascending to erect (sometimes with trunk-like caudex to 50 cm long), scales brown, shiny, lanceolate, setose on margins and surface. **Leaves** few, clustered, 15(–75) cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal 3(–12) pairs of pinnae gradually reduced, the lowermost ca. 5–10 mm long, never glanduliform. **Petiole** 5(–15) cm × 1.5(–3) mm, brown to tan above the base, with scattered, patent scales. **Rachis** glabrescent (hamate-pubescent) abaxially. **Pinnae** sessile, 2–3(–9) × 0.8(–2.0) cm, pinnatifid to ca. 1 mm from costae. **Aerophores** peglike to 0.5 mm. **Buds** lacking. **Veins** 4(–8) pairs per segment. **Indument** on costae, veins, and laminar tissue abaxially of moderately dense, spreading, hamate trichomes mostly 0.2–0.3 mm, lacking glands, sometimes with scattered, brownish, deciduous, linear, entire scales along costae, lamina adaxially with numerous adpressed acicular trichomes 0.2–0.3 mm on costules, veins, and laminar tissue. **Sori** medial, round, exindusiate, receptacle glabrous, sporangia glabrous.

Wet banks and mossy rocky areas, 2750–4000 m, Huánuco.

Panama; Colombia to Peru.

The two Peruvian specimens cited lack the long, erect caudex found in specimens elsewhere and are much smaller with only about three pairs of reduced proximal pinnae (vs. 6–12 pairs elsewhere). However, in the hamate trichomes and other minute characters, the Peruvian specimens seem very close to authentic material of *T. brachypus*. The parenthetical measurements in the description are the upper limit in Ecuadorian specimens.

Huánuco: Tambo de Vaca, *Macbride 4364* (F). Mito, *Bryan 176A* (F).

12. *Thelypteris leoniae* A. R. Sm., *sp. nov.*

Inter species subg. *Amauropeltae* ob paleis rhachidis *T. funckii* (Mett.) Alston proxima sed lamina usque ad 15–25 cm lata, pinnis proximalibus minus numerosis (4–5 paribus) et abruptius reductis, aerophoris tuberculiformibus vel elongatis usque ad 1 mm, paleis rhachidis setulosis margine, soris exindusiatis trichomatibus caespitosis 0.3–0.5 mm recedens.

Stem not seen, presumably ascending or erect, scales brown, shiny, narrowly lanceolate, densely setose on margins and surface. **Leaves** probably few and clustered, 40–85 cm long. **Lamina** subcoriaceous, 1-pinnate-pinnatifid, proximal ca. 4–5 pairs of pinnae subabruptly reduced, the lowermost 5–10 mm long, not glanduliform. **Petiole** ca. 15 cm × 2–5 mm, brownish to tan above the base, with dense, spreading, castaneous, linear-lanceolate scales 3–8 mm long. **Rachis** with dense, spreading scales 3–5 mm long and acicular trichomes abaxially, and with reddish trichomes adaxially. **Pinnae** sessile, 4–12 × 1–2 cm, pinnatifid 2–3 mm from costae. **Aerophores** tuberculiform or peglike to 1 mm. **Buds** lacking. **Veins** 6–9 pairs per segment, lowermost pair running to or just above the sinus. **Indument** on costae abaxially of dense, spreading, acicular trichomes mostly 0.5–1 mm, veins and laminar tissue with acicular and hamate trichomes mostly 0.2–0.5 mm, glands lacking, costal scales dense, spreading, like those of rachis but shorter, 2–3 mm, lamina adaxially with numerous spreading or ascending acicular trichomes 0.5–1 mm on costules, veins, and laminar tissue. **Sori** medial to suprmedial, round to slightly oblong, exindusiate, receptacle with a tuft of acicular trichomes 0.3–0.5 mm, sporangia glabrous.

TYPE—Peru, San Martín, Prov. Mariscal Cáceres, Río Abiseo National Park, Chochos valley, 3500 m, *León 1906* (holotype, F!; isotype, USM!).

Cloud forests, 2600–3500 m, San Martín and Cuzco.

Peru and Bolivia.

This species is most closely related to *T. funckii* (Mett.) Alston, which differs in the narrower lamina, greater number of gradually reduced proximal pinnae (nearly to rhizome), presence of large indusia, rachis scales lacking marginal setae, and absence of peglike aerophores at the base of the pinnae abaxially. *Thelypteris funckii* occurs from Costa Rica to Ecuador, Venezuela, and Guyana. Another close relative is *T. frigida* (Christ) A. R. Sm. & Lellinger, from Honduras to Costa Rica and Venezuela. This species differs primarily in

being exindusiate and having fewer rachis and petiole scales. The two Peruvian collections of *T. leoniae* agree with one from Bolivia: Unduavi, Nov 1910, *Buchtien 2647* (UC).

Cuzco: Prov. Paucartambo, Km 130 hacia Kosñipata, Parque Nacional del Manú, *Núñez et al. 8493*, in part (uc!).

13. *Thelypteris furva* (Maxon) R. Tryon, *Rhodora* 69: 6. 1967.

Dryopteris furva Maxon, *J. Wash. Acad. Sci.* 34: 24. 1944. TYPE: Peru [Huánuco], near Playapampa, *Macbride 4517* (holotype, F!; photo, GH; isotypes, F!, us!).

Stem ascending, scales brown, dull to shiny, ovate-lanceolate, setose on margins and surface. **Leaves** few, clustered, 55–90 cm long. **Lamina** chartaceous to subcoriaceous, 1-pinnate-pinnatifid, proximal 6–8 pairs of pinnae gradually reduced, the lowermost 2 mm long, sometimes glanduliform. **Petiole** ca. 15–25 cm × 1.5–2 mm, atropurpureous or purple-brown and scaleless above the base. **Rachis** with moderately dense trichomes 0.2 mm abaxially. **Pinnae** sessile, 3–8 × 1.0–2.3 cm, pinnatifid ca. 1–2 mm from costae, segments 2–3.5 mm wide. **Aerophores** absent or weakly developed. **Buds** lacking. **Veins** 4–10 pairs per segment. **Indument** on costae, veins, and laminar tissue abaxially of sparse to moderately dense, spreading, acicular trichomes 0.1–0.2 mm, glands absent, costal scales lacking, lamina adaxially with dense, adpressed trichomes 0.2–0.3 mm on costules, veins, and laminar tissue. **Sori** medial, round, indusia with dense trichomes 0.1 mm, receptacle and sporangia glabrous.

Wet cloud forests, 2300–2800 m, Huánuco and Pasco.

Known only from the type and one other collection.

Pasco: Prov. Oxapampa, San Alberto, Cordillera de Yanachaga, *van der Werff et al. 8420* (MO, UC).

14. *Thelypteris pilosula* (Mett.) R. Tryon, *Rhodora* 69: 7. 1967.

Aspidium pilosulum Mett., *Fil. hort. bot. lips.* 130. 1856. TYPE: Cultivated plant, said to have originated from Caracas, Venezuela, perhaps sent by *Gollmer* (possible holotype, B!).

Dryopteris pilosula (Mett.) Hieron., *Hedwigia* 46: 332. 1907.

Dryopteris rimbachii Rosenst., *Repert. Spec. Nov. Regni Veg.* 7: 147. 1909. TYPE: Ecuador, Mt. Tunguragua, *Rimbach 119* (isotypes, BM, UC!, US!).

Dryopteris macbridei C. Chr. & Maxon, *J. Wash. Acad. Sci.* 34: 25. 1944. TYPE: Peru, (Huánuco), near Yanano, *Macbride 3828* (holotype, us!; isotype, F!).

Thelypteris macbridei (C. Chr. & Maxon) R. Tryon, *Rhodora* 69: 7. 1967.

Amauropelta pilosula (Mett.) Löve & Löve, *Taxon* 26: 325. 1977.

Stem short-creeping or ascending, scales brown, somewhat shiny, lanceolate, setose and sometimes stipitate-glandular on margins and surface. **Leaves** several, approximate, (22–)50–70(–120) cm long. **Lamina** chartaceous to subcoriaceous, 1-pinnate-pinnatifid, proximal 5–7 pairs of pinnae gradually reduced, the lowermost ca. 1–2 mm long, sometimes glanduliform. **Petiole** 6–20 cm × 2–5 mm, tan and scaleless above the base. **Rachis** with dense, acicular trichomes 0.5–1.5 mm abaxially, sometimes with short-stipitate glands. **Pinnae** sessile, 2.5–8(–15) × 0.6–1.5(–2.2) cm, deeply pinnatifid to within 1 mm of costae, segments 1.5–3(–4) mm wide. **Aerophores** absent. **Buds** lacking. **Veins** 3–8 pairs per segment. **Indument** on costae, veins, and sometimes laminar tissue abaxially of sparse to dense, spreading, acicular trichomes mostly (0.3–)0.5–1.5 mm, also with yellowish, short-stipitate glands, costal scales lacking, lamina adaxially with numerous spreading or ascending trichomes 0.5–1 mm on costules, veins, and sometimes laminar tissue. **Sori** medial to supramedial, round, indusia glabrous or with marginal setae and often short-stipitate glands, receptacle and sporangia glabrous.

Wet montane forests, shaded ravines, slopes, and ledges, 1800–3300 m, Cajamarca and Amazonas, south to Apurímac and Cuzco.

Greater Antilles; southern Mexico to Panama; Colombia to Bolivia; Venezuela.

Cajamarca: Trail from Las Huaringas to Huancabamba, *Davis & Turner 729* (GH). **Amazonas:** Cerros Calla Calla, E side, 5 km above Leimebamba on road to Balsas at San Miguel, *Hutchison & Wright 4816* (UC, USM). **Huánuco:** Prov. Huánuco, 32 km from Huánuco on road to La Union, *D. Smith et al. 2189* (F). **Junin:** Between Palea and turnoff to San Ramón, *Correll & Smith P782* (GH). **Ayacucho:** Pampalea, between Huanta and Río Apurímac, *Killip & Smith 23271* (NY). **Apurímac:** Prov. Abancay, Abancay, *Vargas 16602* (GH). **Cuzco:** Quispicanchi, 16 km down from Marcapata, *Fernández & Japanese Exp. C-35* (UC).

5. *Thelypteris rufa* (Poiret) A. R. Sm., Flora Ecuador 18: 77. 1983.

Polypodium rufum Poiret in Lam., Encycl. 5: 532. 1804. TYPE: Peru, collector not known, possibly *Pavón?* (holotype, P!).

Dryopteris rufa (Poiret) C. Chr., Index fil. 290. 1905.

Dryopteris subandina C. Chr. & Rosenst., Repert. Spec. Nov. Regni Veg. 12: 472. 1913. TYPE: Bolivia, Cantaña ad fl. Ilimano, *Buchtien 3120* (holotype, S).

Dryopteris limaensis Copel., Univ. Calif. Publ. Bot. 19: 298. 1941. TYPE: Peru, Dist. Lima, road Chosica to Matucana, *Mexia 4079* (holotype, UC!; isotypes, GH!, MO!, US!).

Thelypteris subandina (C. Chr. & Rosenst.) R. Tryon, *Rhodora* 69: 8. 1967.

Thelypteris limaensis (Copel.) Reed, *Phytologia* 17: 288. 1968.

Stem creeping to ascending, scales brown, dull to somewhat shiny, ovate-lanceolate, glabrous on margins and surface. **Leaves** several, approximate, 10–135 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal ca. 7–14 pairs of pinnae very gradually reduced, the lowermost 5 mm long or less, occasionally glanduliform. **Petiole** 4–20 cm × 2–5 mm, tan to stramineous and lacking scales above the base. **Rachis** glabrescent or with moderately dense, spreading trichomes mostly 0.2–0.3 mm abaxially, sometimes with short-stipitate glands less than 0.1 mm. **Pinnae** sessile, 3–12 (–15) × 0.7–2.5 cm, deeply pinnatifid to ca. 1.5 mm or less from costae, segments 2–4(–5) mm wide. **Aerophores** lacking. **Buds** lacking. **Veins** 4–10(–13) pairs per segment. **Indument** on costae, veins, and often lamina abaxially of sparse to dense, spreading, acicular trichomes mostly 0.2–0.3(–0.6) mm, occasionally also with yellowish short-stipitate glands 0.1 mm or less, costal scales lacking, lamina adaxially glabrescent or with sparse to dense, ascending trichomes 0.1–0.2 mm on costules, veins, and laminar tissue. **Sori** medial to supramedial, round, indusia glabrous or usually with sparse to dense trichomes 0.1–0.3 mm and sometimes minute glands, receptacle glabrous, sporangia glabrous or often with setae 0.1–0.2 mm from capsule.

Weedy fern of irrigation ditches, small streams, and disturbed sites, 1000–2800(–3200) m, Cajamarca and La Libertad, south to Apurímac and Cuzco.

Ecuador to Bolivia.

This species is closely related to *T. glandulosolanosa*, but differs in the simple (vs. often forked) veins that are often raised abaxially, shorter non-septate trichomes usually less than 0.3 mm long

on the costae and indusia abaxially, absence of deep red globose or pyriform glands along the costae and costules abaxially, commonly setose sporangia, and the generally smaller indusia. More than half of the numerous collections seen have at least some setose sporangia; however, not all sporangia are setose.

Cajamarca: Ca. 9 km W of San Juan and 46 km SW of Cajamarca on road to San Pedro de Lloc, *Dillon & Whalen 4069* (F, UC). **Amazonas:** Prov. Bongará, Pomacocha, *D. Smith 6021* (MO). **La Libertad:** Prov. Otuzco, Sinsicap, Orga (Yerba Buena-Sinsicap), *López 2275* (GH). **Lima:** Prov. Lima, near Río Santa Eulalia, Chosica, 40 km E of Lima, *Tryon & Tryon 5341* (F, GH, NY, UC). **Ancash:** Road Huaras to Casma, *Tryon & Tryon 6566* (F, GH, VEN). **Huánuco:** Prov. Huánuco, 6 km S of Huánuco, *Stork & Horton 9381* (F, UC). **Junín:** Tarma, *Killip & Smith 21908* (F, NY). **Apurímac:** Prov. Andahuayles, Huancaraná, *Velarde 4948* (GH). **Cuzco:** Quebrada de Sappi, Cuzco, *Tryon & Tryon 5356* (GH, USM).

16. *Thelypteris glandulosolanosa* (C. Chr.) R. Tryon, *Rhodora* 69: 6. 1967. **Figure 3.**

Dryopteris glandulosolanosa C. Chr., Dansk. Bot. Ark. 9(3): 61. 1937. LECTOTYPE (chosen here): Peru, Cuzco, Prov. Quispicanchi, Dist. Huasao, *Herrera 214* (us 1198732!; isolectotype, us 1198733!).

Stem short- to long-creeping, scales brown, dull to somewhat shiny, appressed, ovate-lanceolate, glabrous or sparingly ciliate on margins, surface glabrous. **Leaves** several, approximate to distant, 20–120(–250) cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal (4–)7–12 pairs of pinnae gradually reduced, the lowermost 2–10 mm long, sometimes glanduliform. **Petiole** 4–30(–45) cm × 1.5–6 mm, stramineous and lacking scales above the base. **Rachis** glabrescent or with moderately dense, spreading trichomes mostly 0.3–1 mm abaxially. **Pinnae** sessile, 2.5–10(–13) × 0.7–2.0(–2.5) cm, deeply pinnatifid to within 1 mm of costae, segments 2–5 mm wide. **Aerophores** lacking. **Buds** lacking. **Veins** 4–12 pairs per segment, often forked, sunken, and sometimes darkened. **Indument** on costae, veins, and often laminar tissue abaxially of sparse to dense, spreading, acicular or often silky, septate trichomes mostly 0.3–1.5 mm, usually with deep red to orangish, stalked or sessile, pyriform glands along costae, costules, and veins, costal scales lacking, lamina adaxially with sparse to moderately dense, ascending or adpressed acicular trichomes 0.1–0.4 mm and sometimes deep red pyriform glands on costules and veins, laminar tissue glabrescent or with adpressed trichomes. **Sori** supramedial to inframarginal,

round, indusia with sparse to dense silky trichomes 0.3–1.0 mm, receptacle and sporangia glabrous.

Along streams and irrigation ditches, (2300–) 2800–4100 m, Lambayeque south to Puno.

Southern Ecuador to northwestern Argentina.

This species is highly variable in the density and length of trichomes on the abaxial axes and indusia. The type and many other collections, especially from Dept. Cuzco, have very long, silky, septate trichomes; in other collections, the trichomes may be sparser, shorter, and more crispate. This latter variant is close to *T. rufa*, under which the major differences are listed. Still other variants have only a very small indusium bearing a tuft of trichomes, e.g., *Shepard 74a* (GH), from Puno, and *Correll & Smith P858* (GH), from Cajamarca. In general, *T. glandulosolanosa* occupies a similar, but slightly more southerly range and occurs at generally higher elevations than *T. rufa*. But the two species probably grow together, and it would not be surprising if they hybridize. Another closely related but still more southern species in this group is *T. argentina* (Hieron.) Abbiatti.

Lambayeque: Prov. Lambayeque, Penachi, *Llatas Quiroz 1397* (F). **Cajamarca:** Ca. 25 km from Cajamarca on road to Bambamarca, *Correll & Smith P858* (GH), *P860* (GH). **Ancash:** Prov. Bolognesi, Cerro Capillapunta, sur de Chiquián, *Cerrate 146* (F, GH). **Huánuco:** Mito, *Macbride & Featherstone 1706* (F). **Lima:** Prov. Huarochiri, Antisha, *Müller & Müller 483* (GH). **Junín:** Prov. Huancayo, ca. 9 km from Huancayo towards Chameseria, *Saunders 648* (F, GH, K). **Huancavelica:** Yzcuchaca, *Kunkel 341c* (B). **Cuzco:** Andahuayllilla, *Coronado 150* (GH, UC). **Arequipa:** Chilena Valley, *Stafford 559* (F). **Puno:** Prov. Sandia, Cuyo-cuyo, *Johns 83-143* (F).

17. *Thelypteris demissa* A. R. Sm., *sp. nov.*

A. T. rufae (Poiret) A. R. Sm. et specierum affinium distinguenda foliis minoribus 25–50 cm longis, pinnis reductis proximalibus plus minusve 6, pinnis 2–3 × 0.8–1.0 cm, venis segmentorum 3–5-jugis, et praesertim soris exindusiatis, sporangiis glabris.

Stem ascending, scales brown, somewhat shiny, lanceolate, sparsely setose on margins and surface. **Leaves** few, clustered, 25–50 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal ca. 3 pairs of pinnae subabruptly reduced, the lowermost 1–3 mm long or less, not glanduliform. **Petiole** 5–10(–25) cm × 1–2 mm, brownish to stramineous and lacking scales above the base. **Rachis** with sparse trichomes ca. 0.2 mm abaxially. **Pinnae** sessile, 2–3 × 0.8–1.0 cm, pinnatifid to ca. 1

mm from costae. **Aerophores** absent or tuberculiform to 0.2 mm. **Buds** lacking. **Veins** 3–5 pairs per segment. **Indument** on costae and veins abaxially of moderately dense, spreading trichomes ca. 0.2 mm, laminar tissue glabrous, glands lacking, costal scales lacking, lamina adaxially with ascending trichomes 0.2 mm on costules, veins, and laminar tissue. **Sori** medial to supramedial, round, exindusiate, receptacle glabrous, sporangia glabrous.

TYPE—Peru, Amazonas, Prov. Chachapoyas, Cerros Calla Calla, east side, 18 km above Leimebamba on road to Balsas, *Hutchison & Wright 4870* (holotype, UC!; isotypes, F!, GH!, NY, USM!).

Cloud forest, 3100 m, Amazonas.

Known with certainty only from the type gathering.

This species may be most closely related to *T. rufa*, with which it agrees in pubescence and dissection, but it differs in the exindusiate sori, glabrous sporangia, and smaller fronds with fewer reduced proximal pinna-pairs. *Hutchison & Wright 4871* (F in part, not GH or UC), from the same locality as the type, appears also to be this species.

18. *Thelypteris canadasi* (Sodirol) Alston, J. Wash. Acad. Sci. 48: 234. 1958.

Nephrodium canadasi Sodirol, Recens. crypt. vasc.

Quit. 48. 1883. **TYPE:** Ecuador, Pichincha, Puluahua, Hacienda Niebli, *Sodirol* (type material, P).

Nephrodium macradenium Sodirol, Recens. crypt. vasc.

Quit. 47. 1883. **TYPE:** Ecuador, *Sodirol* (possible type material, P!; possible isosyntype, UC!).

Dryopteris canadasi (Sodirol) C. Chr., Index fil. 256. 1905.

Stem ascending to erect, scales tan to brown, dull to somewhat shiny, ovate-lanceolate, glabrous or sparsely setose on margins and surface. **Leaves** few, clustered, 100–300 cm long, mucilaginous when young. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal pairs of pinnae abruptly reduced, the lowermost 1 mm long or less, glanduliform. **Petiole** 15+ cm × 4–10 mm, tan to stramineous and with scattered, appressed scales above the base. **Rachis** with dense, fasciculate trichomes 0.1–0.2 mm abaxially. **Pinnae** sessile, 12–25 × 1.6–3(–4) cm, deeply pinnatifid to within 1 mm of costae. **Aerophores** scalelike to 5 mm at pinna bases, shorter ones also present at pinnule bases. **Buds** lacking. **Veins** 10–30 pairs per segment. **Indument** on costae and veins abaxially of moderately dense to dense, fasciculate trichomes mostly 0.5–0.2 mm,

ften with shorter acicular trichomes 0.1 mm on laminar tissue, glands lacking, costal scales tan, appressed, lamina adaxially with numerous ascending to adpressed trichomes 0.1 mm on costules, veins, and laminar tissue. **Sori** medial, round to oblong, indusia with trichomes 0.1 mm, receptacle and sporangia glabrous.

Montane rain forests, 2000–2800 m, Amazonas, Uanuco, Pasco, and Cuzco. Ecuador to Bolivia. This differs from *T. thomsonii* primarily in lack of glands on laminar tissue and indusia. More complete collections and field study are needed to establish whether this difference is taxonomically significant.

Amazonas: Chachapoyas, 17–7 km down Cerro Callalla toward Leimebamba, *Edwin & Schunke 3691* (F). **Uanuco:** Chaglla, *Macbride 3648* (F). Mito, *Macbride Featherstone 1618* (F, G). **Pasco:** Huancayo, Oxapampa, *Soukup 2348* (F, GH). **Cuzco:** Urubamba, Machu Picchu, Puncuyo, 10 km SW of Incatambo, *Peyton & Peyton 1377* (MO). Urubamba, Machu Picchu, 0.5 km N of confluence of Sayamarca and Aobamba rivers, *Peyton & Peyton 1498* (MO).

9. ***Thelypteris thomsonii*** (Jenman) Proctor, Bull. Inst. Jamaica, Sci. Ser. 5: 65. 1953.

Polypodium thomsonii Jenman, J. Bot. 24: 272. 1886. TYPE: Jamaica, St. Andrew Parish, New Haven Gap, *Jenman J.P. 254* (holotype, U, according to Proctor, 1985; isotypes, NY, US).

Dryopteris thomsonii (Jenman) C. Chr., Index fil. 298. 1905.

Dryopteris stuebelii Hieron., Hedwigia 46: 340, t. 6, f. 13. 1907. SYNTYPES: Colombia, *Stübel 146, 439* (B).

Amauropelta thomsonii (Jenman) Pic.-Ser., Webbia 31: 251. 1977.

Stem ascending to erect, scales brown, somewhat shiny, ovate-lanceolate, appressed, setose on margins and surface. **Leaves** few, approximate, 100–150(–250) cm long, mucilaginous when young. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal ca. 6 pairs of pinnae abruptly reduced, the lowermost 1 mm long or less, glanduliform. **Petiole** ca. 20–40(–100) cm × 5–6(–10) mm, tan to stramineous and scaleless above the base. **Rachis** with dense, fasciculate trichomes 0.05–0.2 mm abaxially. **Pinnae** sessile, 10–20(–30) × 1.8–3.0(–4.5) cm, deeply pinnatifid to within 1 mm of costae, segments 3–5 mm wide. **Aerophores** scalelike to 6 mm at pinna bases, shorter ones to 1.5 mm also usually present at pinnule bases. **Buds** lacking. **Veins** (12–)16–25 pairs per segment. **Indu-**

ment on costae and veins abaxially of moderately dense to dense, fasciculate (appearing stellate from base) trichomes 0.05–0.2 mm, with a few acicular trichomes 0.1 mm on laminar tissue, also with numerous red to yellow, sessile glands on lamina tissue, costal scales lacking or few, tan, appressed, lamina adaxially with numerous ascending trichomes 0.1 mm on costules, veins, and laminar tissue. **Sori** inframedial to supramedial, round to oblong, indusia with reddish to yellowish sessile glands, sometimes sparsely setose, receptacle and sporangia glabrous.

Montane rain forests and cloud forests, 680–3000 m, Cuzco and Madre de Dios.

Jamaica; Hispaniola; southern Mexico to Panama; Colombia to Peru.

Cuzco: Prov. Paucartambo, entre Pillahuata y La Esperanza, *León 2221*, in part (UC, USM). Prov. La Convención, Dist. Vilcabamba, trail Yupanqui to Río Apurímac, between Rumichurco and Alcobamba, *Davis et al. 1229* (GH). **Madre de Dios:** Prov. Manú, Carbon-Salvación, *Vargas 16902* (GH).

20. ***Thelypteris phacelothrix*** (Rosenst.) R. Tryon, Rhodora 69: 7. 1967.

Dryopteris phacelothrix Rosenst., Repert. Spec. Nov. Regni Veg. 11: 56. 1912. TYPE: Bolivia, Unduavi, N. Yungas, *Buchtien 2709* (holotype, s?, isotype, UC!).

Stem unknown, probably ascending, scales brown, dull to somewhat shiny, ovate, appressed, glabrescent or setose on margins and surface. **Leaves** ca. 70 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal 6–10 pairs of pinnae subabruptly reduced, the lowermost 1 mm long or less, glanduliform. **Petiole** ca. 20 cm × 3–5 mm, brownish to stramineous above the base, with scattered, more or less appressed scales. **Rachis** with dense, fasciculate trichomes 0.2–0.3 mm abaxially. **Pinnae** sessile, 6–7 × 1.0–1.5 cm, deeply pinnatifid to within 1 mm of costae, segments 2–3 mm wide. **Aerophores** peglike, to 1 mm. **Buds** lacking. **Veins** 6–8 pairs per segment. **Indument** on costae and veins abaxially of dense, fasciculate trichomes mostly 0.2–0.3 mm, with mostly non-fasciculate trichomes 0.1 mm on laminar tissue, glands lacking, costal scales castaneous, ovate, to 2 mm, lamina adaxially with numerous ascending to adpressed, mostly nonfasciculate trichomes 0.1–0.3 mm on costules, veins, and laminar tissue. **Sori** medial, round, sometimes confluent at maturity, indusia lacking or reduced to a nearly hidden few-

celled fragment, receptacle (or indusial fragment) setose with trichomes 0.2 mm, sporangia glabrous.

Habitat and elevation not known, probably montane rain forest, Junín.

Peru and Bolivia.

The sole Peruvian specimen seen has the costal and rachis trichomes not so obviously fasciculate as in the type. In the castaneous costal scales, small, setose indusium, and general laminar dissection, it is very similar.

Junín: [Prov. Huancayo], Cuesta of Huanacabra, *Mathews* 937 (GH).

21. *Thelypteris pavoniana* (Klotzsch) R. Tryon, *Rhodora* 69: 7. 1967.

Polypodium pavonianum Klotzsch, *Linnaea* 20: 386. 1847. TYPE: Peruviae Andium nemoribus, *Ruíz & Pavón* [*Herb. Ruíz no. 55*] (holotype, v!; frag., us!).

Polypodium crossii Baker, *Ann. Bot.* 5: 455. 1891. TYPE: Ecuador, Sierra de Roritroche, Andes of Loja, *Cross* (holotype, k!).

Dryopteris pavoniana (Klotzsch) C. Chr., *Index fil.* 283. 1905.

Dryopteris pavoniana var. *contracta* Hieron., *Hedwigia* 46: 333. 1907. TYPE: Peru, near Ines between Pacasmayo and Moyobamba, *Stübel* 1033 (holotype, v!).

Stem short- to long-creeping, scales brown, dull, ovate, sparsely setose on surface. **Leaves** few, approximate to distant, 24–50 cm long. **Lamina** coriaceous, 1-pinnate-pinnatifid, proximal 4–6 pairs of pinnae subabruptly reduced, the lowermost 1 mm long or less, glanduliform. **Petiole** 10–25 cm × 1–2.5 mm, atropurpureous and lacking scales above the base. **Rachis** glabrescent or with sparse trichomes 0.1 mm abaxially. **Pinnae** sessile, 1.5–4.5 × 0.5–0.8 cm, pinnatifid to ca. 1 mm from costae, segments 1.5–2 mm wide, margin strongly inrolled. **Aerophores** peglike, 1–3 mm. **Buds** lacking. **Veins** 3–6 pairs per segment, deeply immersed. **Indument** on costae and veins abaxially of moderately dense, spreading or ascending, acicular trichomes mostly 0.1–0.3 mm, glands absent, costal scales lacking, lamina adaxially glabrous. **Sori** medial, round, exindusiate, receptacle and sporangia glabrous.

Wet slopes and banks, 2550–3300 m, Cajamarca, Amazonas, and Huánuco.

Ecuador to Bolivia; Galápagos.

Cajamarca: South edge of Namora, *Correll & Smith* 896 (GH). **Amazonas:** Prov. Chachapoyas, *Wurdack* 705

(F, GH, UC, USM). Prov. Chachapoyas, Pomacocha (Leimebamba-Balsas), *López et al.* 4393 (GH). **Huánuco:** Mitotambo, above Mito, *Ferreyra* 10348A (GH), 10364 (GH, USM). Mito, *Macbride & Featherstone* 1622 (F, G, GH).

22. *Thelypteris peruviana* (Rosenst.) R. Tryon, *Rhodora* 69: 7. 1967.

Dryopteris peruviana Rosenst., *Repert. Spec. Nov. Regni Veg.* 7: 298. 1909. TYPE: Peru [San Martín], Cerro de Campaña, *Spruce* 4655 (isotypes, k!, w!; frag., us!).

Stem short-creeping to suberect, scales brown, somewhat shiny, lanceolate, setose on margins and surface. **Leaves** several, clustered, 25–100(–180) cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal 3–6 pairs of pinnae abruptly reduced, the lowermost 1 mm long or less, glanduliform. **Petiole** 3–12 cm × 1.5–4(–6) mm, brownish to tan and sparsely scaly above the base. **Rachis** with dense, spreading, acicular trichomes mostly 0.4–1.0 mm abaxially. **Pinnae** sessile, 5–12(–15) × 1–2(–3) cm, deeply pinnatifid to within 1(–2) mm of costae, segments 2–3(–6) mm wide. **Aerophores** tuberculiform to absent. **Buds** lacking. **Veins** 8–14(–18) pairs per segment. **Indument** on costae and veins abaxially of moderately dense to dense, spreading, acicular trichomes mostly 0.2–0.6 mm, trichomes of laminar tissue 0.1–0.2 mm, glands lacking, costal scales dark brown, subclathrate, setose, lamina adaxially with sparse to numerous ascending acicular trichomes 0.1–0.2 mm on costules, veins, and laminar tissue. **Sori** medial to suprmedial, round, exindusiate, receptacle with a few setae to 0.5 mm, sporangia with several setae 0.1 mm on capsule.

Lowland and montane rain forests, on rocks, 380–1500 m, San Martín and Junín.

Ecuador to Bolivia.

Knapp and Mallet 8472 is smaller than other cited specimens, with leaves less than 35 cm, strongly oblique and falcate segments, inequilateral pinnae, and only 2 or 3 reduced proximal pinna pairs. It agrees with other specimens in its scales, trichomes, setose sporangia, and exindusiate sori.

San Martín: Prov. Lamas, Km 47.9 of Tarapoto-Yurimaguas road, *Knapp & Mallet* 8472 (F, MO). **Junín:** Chanchamayo Valley, *Schunke* 1498 (F). Yunguy, *Woytkowski* 6604 (MO).

23. *Thelypteris comptula* A. R. Sm., *sp. nov.*

A speciebus ceteris subg. *Amauropeltae* distinguenda rhachidi abaxialiter dense pubescenti, trichomatibus de-

flexis 0.1–0.2 mm longis, costis abaxialiter paleis atrobrunneis vel nigrescentibus usque ad 1 mm, venis segmentorum usque ad 20-jugis, obliquis costis comparatis, valde falcatis, sori exindusiatis, sporangiis setulosis trichomatibus 0.1 mm longis.

Stem not known, probably ascending to erect, scales not known. **Leaves** incomplete, probably 50–100 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal pinnae not seen, probably abruptly reduced with the lowermost 1 mm long or less and glanduliform. **Petiole** incomplete, at least 3 mm wide, tan above the base. **Rachis** with dense, deflexed and appressed trichomes 0.1–0.2 mm abaxially. **Pinnae** sessile or short-stalked to 1 mm, to 17 × 3 cm, deeply pinnatifid to within 0.5 mm of costae, segments ca. 4 mm wide, oblique and strongly falcate, basal pair of largest pinnae greatly reduced to less than 1/3 the length of the next pair. **Aerophores** tuberculiform. **Buds** not seen. **Veins** to 20 pairs per segment. **Indument** on costae and costules abaxially of dense, slightly antrorse, acicular trichomes mostly 0.1–0.3 mm, the veins and laminar tissue glabrous or with sparse trichomes 0.1 mm, glands lacking, costal scales dark brown or blackish, lanceolate, to 1 mm, setose, laminar tissue adaxially with sparse adpressed trichomes 0.1–0.2 mm. **Sori** medial to supramedial, round, exindusiate, receptacle with a few setae 0.1–0.2 mm, sporangia with minute setae 0.1 mm on capsule.

TYPE—Peru, Cuzco/Madre de Dios, entre 15 Mil y San Lorenzo, Vargas 11698 (holotype, GH!).

Montane forest, 700 m, Cuzco/Madre de Dios. Peru and Bolivia.

This is most closely related to *T. peruviana* but differs in the shorter, strongly deflexed and appressed trichomes 0.1–0.2 mm on the rachis, shorter trichomes on the abaxial costae, more deeply incised pinnae with strongly falcate segments, and the basal segments of largest pinnae greatly reduced. The two species agree in the minutely setulose sporangia and dark costal scales; both also occur at lower elevations than most other species of sect. *Lepidoneuron*.

Paratype: Bolivia, [La Paz], San Josa, 1700 ft, Williams 1246 (NY, 2 sheets).

24. *Thelypteris atrorubens* (Kuhn) A. R. Sm., *comb. nov.*

Aspidium atrorubens Kuhn, Linnaea 36: 112. 1869. **TYPE:** Peru (Puno), St. Gavan (San Gabán), Lechler 2267 (holotype, B!).

Dryopteris atrorubens (Kuhn) C. Chr., Index fil. 253. 1905.

Stem not known. **Leaves** ca. 150 cm long. **Lamina** thin-chartaceous, 1-pinnate-pinnatifid, proximal ca. 8 pairs of pinnae abruptly reduced and glanduliform, 1 mm long or less. **Petiole** ca. 15 cm × 2–3 mm, atropurpureous, shining, lacking trichomes and scales. **Rachis** purplish brown, with sparse spreading or subappressed trichomes 0.2–0.3 mm. **Pinnae** sessile, up to 18 × 2.8 cm, deeply pinnatifid to within 0.5 mm of costae, segments 3–5 mm wide, spreading. **Aerophores** lacking. **Buds** lacking. **Veins** 8–11 pairs per segment. **Indument** on costae and veins abaxially of scattered spreading trichomes mostly 0.1–0.3 mm, laminar tissue glabrous, glands lacking, costal scales lacking, lamina adaxially with scattered adpressed trichomes 0.1–0.2 mm on costules, veins, and laminar tissue. **Sori** supramedial, round, indusia less than 0.3 mm, setose with trichomes 0.1 mm, receptacle glabrous, sporangia glabrous.

Montane forests, 1800–2000 m, Cuzco and Puno.

Known only from Peru.

The Vargas collection is tentatively assigned here. It differs from the type in lacking trichomes on the laminar tissue abaxially and in having slightly longer costal trichomes. *Thelypteris atrorubens* differs from most other Peruvian *Thelypteris* by the atropurpureous and shining petiole and proximal part of the rachis. Affinities are uncertain, but it may be an aberrant member of sect. *Uncinella*; however, uncinata trichomes are lacking. The rachis is weak and pinnae are rather lax and widely spaced about 4 cm proximally, 2.5–3 cm distally, suggesting that the leaves may lean on other vegetation. The species does not seem particularly close to others with atropurpureous axes, e.g., *T. arborea* (Brause) A. R. Sm. and *T. pavoniana*.

Cuzco: Prov. Paucartambo, Chacapampa, Vargas 9871 (UC, 2 sheets).

25. *Thelypteris laevigata* (Kuhn) R. Tryon, Rhodora 69: 6. 1967.

Phegopteris laevigata Kuhn, Linnaea 36: 112. 1869.

TYPE: Peru (Puno), Tatanara, Lechler 2628 (holotype, B!).

Dryopteris laevigata (Kuhn) C. Chr., Index fil. 273. 1905.

Stem unknown. **Leaves** ca. 50–100 cm long. **Lamina** thick-chartaceous to subcoriaceous, 1-pinnate-pinnatifid, proximal ca. 4 pairs of pinnae abruptly reduced, the lowermost 2 mm long

or less, glanduliform. **Petiole** 10–20 cm × 2–3 mm, atropurpureous above the base, shining, scales lacking. **Rachis** atropurpureous, glabrous abaxially. **Pinnae** sessile, opposite, up to 7 × 2 cm, pinnatifid to within 2 mm of costae, appearing articulate. **Aerophores** consisting of a darkened swelling subtended by a crescent-shaped ridge. **Buds** lacking. **Veins** 7–10 pairs per segment. **Indument** on costae abaxially of scattered ovate to lanceolate, brownish, appressed scales, trichomes and glands lacking, lamina adaxially with a few scattered, appressed, acicular trichomes 0.2 mm on veins and laminar tissue. **Sori** medial, oblong to elongate, indusia lacking, receptacle and sporangia glabrous.

Without data on habitat or elevation, Puno.

Ecuador and Peru, in the latter, known only from the type.

26. *Thelypteris euchlora* (Sodirol) Reed, *Phytologia* 17: 275. 1968.

Polypodium euchlorum Sodirol, *Recens. crypt. vasc. Quit.* 58. 1883. TYPE: Ecuador, Hacienda Niebli, Sodirol (probable isotype, κ !).

Dryopteris euchlora (Sodirol) C. Chr., *Index fil.* 263. 1905.

Stem long-creeping to ascending, to 1 m long, scales brown, dull, ovate-lanceolate, setose on margins and surface, sometimes glabrescent. **Leaves** few, distant, 100–250 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal ca. 10 or more pairs of pinnae greatly reduced, the lowermost 1 mm long, glanduliform. **Petiole** 30–85 cm × 3–8 mm, tan to stramineous above the base, glabrous. **Rachis** glabrous abaxially, often with reddish trichomes adaxially. **Pinnae** sessile, 12–25 × 2.2–3.5 cm, deeply pinnatifid to within 2 mm of costae, proximal basisopic segments reduced. **Aerophores** tuberculiform or absent. **Buds** lacking. **Veins** 12–20 pairs per segment. **Indument** on costae, veins, and lamina abaxially lacking trichomes or of very sparse trichomes, costal scales brown, linear to lanceolate, subclathrate, ascending or adpressed, lamina adaxially glabrous or with reddish trichomes along costae and occasionally veins. **Sori** medial to supramedial, round to oblong, indusia lacking, receptacle and sporangia glabrous.

Montane rain forests, 1500–2500 m, Amazonas, Huánuco, and Cuzco.

Colombia to Bolivia.

The collection cited from Amazonas is atypical in the contracted fertile fronds.

Amazonas: Prov. Bagua, Cordillera Colán, SE of La Peca, *Barbour* 4104 (MO). **Huánuco:** SW slope of Río LlullaPichis watershed, Cerros del Sira, *Dudley* 13405 (GH). Cushi, *Macbride* 4852 (F). Prov. Huánuco, Dist. Churubamba, crest of Santo Toribio, *Mexia* 8153 (GH, UC). **Cuzco:** Paucartambo, Pillawata, Yanamayo-Tambomayo, *Vargas* 16701 (GH).

27. *Thelypteris pterioidea* (Klotzsch) R. Tryon, *Rhodora* 69: 8. 1967.

Polypodium pterioideum Klotzsch, *Linnaea* 20: 389. 1847. SYNTYPES: Venezuela, Galipan, *Moritz* 291 (B); Venezuela or Colombia, *Karsten* 40 (Coll. II) (B).

Dryopteris pterioidea (Klotzsch) C. Chr., *Index fil.* 287. 1905.

Stem short-creeping to ascending or erect, scales brown, dull to shining, ovate-lanceolate, glabrescent or setose on surface and sparsely ciliate on margins. **Leaves** few, well separated, commonly 1.5–5 m long, sprawling or scandent and supported by other vegetation. **Lamina** chartaceous, 2-pinnate proximally, deeply 1-pinnate-pinnatifid distally, proximal ca. 7 pairs of pinnae abruptly reduced, the lowermost less than 1 mm long, glanduliform. **Petiole** up to 1.3 m × 4–8 mm, stramineous and lacking scales above the densely scaly base. **Rachis** glabrous. **Pinnae** sessile or short-stalked, articulate, proximal ones reflexed, 15–35 (–50) × 5–13 cm, proximal ones 1-pinnate. **Pinnales** entire or crenulate, larger ones constricted at the base, reflexed, proximal ones often reduced to 1/3 the length of the longest, sometimes subauriculate acroscopically. **Aerophores** absent. **Buds** lacking. **Veins** simple or commonly 1–2-forked, often 20 or more pairs per segment. **Indument** on costae and veins abaxially lacking or of sparse antrorse trichomes 0.1–0.3 mm long, glands lacking, costal scales ovate to lanceolate, appressed, brownish, lamina adaxially glabrous. **Sori** supramedial to inframarginal, round or often oblong, exindusiate, receptacle glabrous, sporangia glabrous.

Montane rain forest, middle elevation, Junín. Hispaniola; Colombia and Venezuela to Peru.

Junin: Villa Amoretti, *Kunkel* 606 (GH).

28. *Thelypteris rudis* (Kunze) Proctor, *Bull. Inst. Jamaica, Sci. Ser.* 5: 64. 1953.

Polypodium rude Kunze, *Linnaea* 13: 133. 1839. TYPE: Mexico, Jalapa, *Schiede* (holotype, LZ destroyed). *Dryopteris rudis* (Kunze) C. Chr., *Index fil.* 289. 1905. *Dryopteris engelii* Hieron., *Hedwigia* 46: 339, t. 6, f. 12. 1907. LECTOTYPE (chosen by Christensen, 1907: Venezuela, Mérida, *Engel* 90 (B)). *Dryopteris boqueronensis* Hieron., *Hedwigia* 46: 329, t. 4, f. 5. 1907. TYPE: Colombia, Boqueron de Bogotá, *Stübel* 453 (holotype, B!). *Lastrea rudis* (Kunze) Copel., *Gen. filic.* 140. 1947. *Amauropelta rudis* (Kunze) Pic.-Ser., *Webbia* 31: 251. 1977.

Stem creeping to ascending, scales brown, dull to somewhat shiny, linear- to ovate-lanceolate, densely pubescent to glabrescent on margins and surface. **Leaves** several, approximate to distant, 5–200 cm long. **Lamina** chartaceous to subcoriaceous, 1-pinnate-pinnatifid, proximal ca. 5–12 pairs of pinnae abruptly reduced, the lowermost several pairs 5 mm long or less, often glanduliform. **Petiole** 4–20 cm × 2–6 mm, tan and usually lacking scales above the base, sometimes sparsely scaly. **Rachis** with moderate to dense, spreading to ascending, often reddish trichomes abaxially. **Pinnae** sessile, (5–)10–20 × (1–)1.5–3(–4) cm, deeply pinnatifid to within 1.5 mm of costa. **Segments** mostly 2–5 mm wide, proximal pairs on larger pinnae often reduced. **Aerophores** tuberculiform to peglike. **Buds** lacking. **Veins** 9–20(–25) pairs per segment. **Indument** on costae, veins, and often lamina abaxially of moderately dense to dense, acicular trichomes mostly 0.2–0.8 mm, those of costae and costules ascending to adpressed, a few on lamina sometimes hamate, costal scales lanceolate, brown, sometimes clathrate, lamina adaxially glabrescent or with sparse to moderately dense, ascending trichomes 0.1–0.2 mm on costules, veins, and laminar tissue. **Sori** medial to supramedial, round to oblong, indusia absent, receptacle glabrous or sparingly setose, sporangia glabrous.

Somewhat weedy fern of montane rain forests, elfin forests, especially along road banks and trails, areas of secondary growth, 1700–3100 (1300–4000) m, Cajamarca, Amazonas, Ancash, Huánuco, Pasco, Ucayali, and Cuzco.

Greater Antilles; Mexico to Panama; Colombia to Bolivia; Venezuela; Guyana.

This is the central species of a difficult complex, extremely variable in pubescence, scales, and size of leaves. Features characterizing the species are the presence of often subclathrate scales and ascending to adpressed trichomes on the costae abaxially, exindusiate sori, and abruptly reduced

pinnae proximally, with several pairs of glandlike pinnae below the lowest developed ones. Usually the receptacle is glabrous. Trichomes between veins are either acicular or, especially near the sinus, hamate.

Cajamarca: Prov. San Miguel, Niepos, *Llatas Quiroz* 1529 (F). **Amazonas:** Prov. Chachapoyas, Cerros Calla Calla, 18 km above Leimebamba on road to Balsas, Km 410, *Hutchison & Wright* 4871 (F, GH, UC). **Ancash:** Prov. Huari, Huascarán National Park, Quebrada Pachachaca, *D. Smith et al.* 12616 (UC). **Huánuco:** Muña, trail to Tambo de Vaca, *Macbride* 4293 (GH). **Pasco:** Pichis Trail, Dos de Mayo (as Junín), *Killip & Smith* 25882 (GH). **Ucayali:** La Divisoria (as Loreto), *Aquilar* 850 (GH). **Cuzco:** Prov. Paucartambo, San Pedro, *Vargas* 11343 (GH). **Department Unknown:** Between Pacasmayo and Moyobamba, *Stübel* 1049 (B).

29. *Thelypteris supina* (Sodirol) A. R. Sm., *Fl. Ecuador* 18: 82. 1983.

Nephrodium supinum Sodirol, *Crypt. vasc. Quit.* 241. 1893. SYNTYPES: Ecuador, “provincia de Quito, Riobamba, Bolívar, etc.,” *Sodirol* (possible isosyntypes, NY!, P!, UC!).

Dryopteris supina (Sodirol) C. Chr., *Index fil.* 296. 1905.

Stem short-creeping to ascending, scales brown, dull to somewhat shiny, lanceolate to ovate-lanceolate, glabrous to sparsely pubescent on margins and surfaces. **Leaves** several, approximate to subdistant, (60–)75–200 cm long. **Lamina** subcoriaceous, 1-pinnate-pinnatifid, proximal (4–)8–10 pairs of pinnae subabruptly reduced, the lowermost 2–4 pairs less than 5 mm long. **Petiole** mostly 10–20 cm × 2–6(–8) mm, tan to stramineous above the base, often with scattered scales. **Rachis** with moderately dense to dense, spreading or often deflexed, hyaline trichomes mostly 0.2–0.4(–0.6) mm abaxially. **Pinnae** sessile, mostly 10–25 × (1–)1.5–3.5(–5.5) cm. **Segments** mostly 2–5 mm wide, usually separated by broad sinuses, proximal ones of larger pinnae reduced and often overlapping rachis. **Aerophores** tuberculiform. **Buds** lacking. **Veins** 8–15(–30) pairs per segment. **Indument** on costae, veins, and laminar tissue abaxially of usually dense, spreading or ascending trichomes mostly 0.2–0.4 mm, costal scales lanceolate, brown, sometimes clathrate, lamina adaxially glabrescent or with sparse to moderately dense ascending trichomes 0.1–0.3 mm on costules, veins, and laminar tissue. **Sori** medial to supramedial, round to oblong, confluent with age, exindusiate, receptacle glabrous or sparingly setose, sporangia glabrous.

Montane forest, ca. 2200 m, Huánuco.

Colombia to Peru.

The description is drawn from the numerous Ecuadoran collections and the single, unusually large Peruvian one.

Huánuco: Prov. Leoncio Prado, Km 463 on Lima-Tingo María road, *Young & Sullivan 888* (F).

30. *Thelypteris pilosohispida* (Hooker) Alston, J. Wash. Acad. Sci. 48: 233. 1958.

Nephrodium pilosohispidum Hooker, Sp. fil. 4: 105. 1862. TYPE: Ecuador, Bolívar, Volcán Chimborazo, *Spruce* (holotype, K!, 2 sheets; isotype, B).

Nephrodium retrorsum Sodiro, Recens. crypt. vasc. Quit. 51. 1883. TYPE: Ecuador, Pichincha, Cerro Corazón, *Sodiro* (possible type material at K!, *Sodiro 44/20*).

Dryopteris retrorsa (Sodiro) C. Chr., Index fil. 288. 1905.

Dryopteris pilosohispida (Hooker) C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 10: 148. 1913.

Dryopteris dumetorum Maxon, J. Wash. Acad. Sci. 34: 26. 1944. TYPE: Peru, [Huánuco], near Mito, *Macbride & Featherstone 1667* (holotype, F!; photo, MO; isotype, US!).

Thelypteris dumetorum (Maxon) R. Tryon, *Rhodora* 69: 5. 1967.

Thelypteris retrorsa (Sodiro) A. R. Sm., Fl. Ecuador 18: 71. 1983.

Stem creeping, scales brown, somewhat shiny, lanceolate, sparsely to densely setose on margins and surfaces. **Leaves** few, subdistant, 80–120 (–200+) cm long. **Lamina** subcoriaceous, 1-pinnate-pinnatifid to barely 2-pinnate in large forms, proximal 5–15 pairs of pinnae subabruptly reduced, the lowermost several (up to 12) pairs less than 5 mm long, often glanduliform. **Petiole** 5–20 cm × 4–7(–10) mm, tan and usually densely scaly at base, sparsely scaly distally. **Rachis** with moderately dense to usually dense, spreading trichomes mostly 0.5–1.5 mm, often reddish abaxially. **Pinnae** sessile, 10–20 × 1.7–3(–5) cm, deeply pinnatifid to within 1 mm of costae, or incised to the costae on larger proximal pinnae. **Segments** mostly 3–6 mm wide, proximal pairs on larger pinnae usually reduced and often strongly reflexed. **Aerophores** tuberculiform. **Buds** lacking. **Veins** 12–20(–25) pairs per segment. **Indument** of costae and veins abaxially of moderately dense to dense, spreading to slightly ascending, acicular trichomes mostly 0.5–1 mm, laminar tissue glabrous or sparsely pubescent, costal scales lanceolate, brown,

shiny, not or weakly clathrate, often setose on margin, lamina adaxially glabrescent or with sparse to moderately dense, ascending trichomes mostly 0.4–1 mm on costules and veins, laminar tissue glabrous. **Sori** medial to supramedial, round to oblong, partially hidden by revolute segment margin, exindusiate, receptacle glabrous or sometimes setose, sporangia glabrous.

Cloud forests, along roadsides and banks, 2400–3100 m, Amazonas and Huánuco.

Hispaniola; southern Mexico to Costa Rica; Colombia to Venezuela and Bolivia.

Thelypteris retrorsa differs primarily in the more reflexed pinna segments, more deeply incised pinnae cut nearly or quite to the costa, and in the slightly denser pubescence. These differences do not seem of sufficient importance for recognition of two taxa and may be partially the result of exposure and size of plants.

Amazonas: Prov. Chachapoyas, Cerros Calla Calla, 18 km above Leimebamba on road to Balsas, *Hutchison & Wright 4871B* (uc). Cerro Puma Urco, *Soukup 4084* (MO). Prov. Chachapoyas, 17–7 km down Cerro Calla-Calla toward Leimebamba, *Edwin & Schunke 3688* (F, USM). **Huánuco:** Muña, trail to Tambo de Vaca, *Macbride 4334* (F).

31. *Thelypteris corazonensis* (Baker) A. R. Sm., Fl. Ecuador 18: 38. 1983.

Nephrodium corazonense Baker, J. Bot. 15: 163. 1877. (as “*carazanense*”). TYPE: Ecuador, Pichincha, Cerro Corazón, Jul 1873, *Sodiro 44/7* (holotype, K!).

Dryopteris corazonensis (Baker) C. Chr., Index fil. 258. 1905.

Stem creeping to ascending or suberect, scales brown, dull to somewhat shiny, lanceolate, setose on margins and surfaces or glabrescent. **Leaves** several, approximate, (60–)100–250 cm long. **Lamina** subcoriaceous, 1-pinnate-pinnatifid, proximal ca. 5–10 pairs of pinnae abruptly reduced, the lowermost several pairs less than 5 mm long. **Petiole** to 120 cm × 4–8 mm, stramineous and lacking scales above the base, or with sparse scales distally. **Rachis** with moderately dense to dense, spreading, hyaline to reddish trichomes 0.5–2 mm long abaxially. **Pinnae** sessile, (7–)15–25 × (2–)3–4 cm, deeply pinnatifid to within 2 mm of costae. **Segments** mostly 3–5 mm wide, proximal pairs on larger pinnae slightly reduced and usually reflexed, overlapping rachis. **Aerophores** tuber-

culiform or peglike. **Buds** lacking. **Veins** (9–)15–25 pairs per segment. **Indument** on costae and veins abaxially of moderately dense, spreading, acicular trichomes 0.5–1.5 mm, laminar tissue glabrous, costal scales lanceolate, brown to blackish, setose, strongly clathrate, lamina adaxially with sparse to moderate, ascending trichomes 0.5–1.5 mm on costules and veins, laminar tissue glabrous. **Sori** medial to supramedial, round to oblong, exindusiate, receptacle glabrous or occasionally sparingly setose, sporangia glabrous.

Forming trunks to ca. 30 cm, montane rain forests, 2285–2535 m, Cuzco.

Ecuador and Peru.

This differs from *T. brausei* primarily in the presence of stiff trichomes on the costules and veins adaxially, costal scales more decidedly clathrate (surface walls hyaline), and somewhat longer but fewer costal trichomes abaxially. These differences may be insufficient to distinguish the two as species.

Cuzco: Quillabamba, Santa Teresa, between Lambras Pata and Mandornilloc, 0.5 km SW of La Playa, *Peyton & Peyton 1216* (MO). Urubamba, Machu Picchu, 0.5 km N of union of Sayacmarca and Aobamba rivers, *Peyton & Peyton 1464* (MO).

32. *Thelypteris brausei* (Hieron.) Alston, J. Wash. Acad. Sci. 48: 233. 1958.

Dryopteris brausei Hieron., Hedwigia 46: 337, t. 6, f. 11. 1907. LECTOTYPE (chosen by Christensen, 1907, p. 327): Colombia, Río Paez, itinere ab Popayan ad montem Huila, *Stübel 145* (B!).

Stem short-creeping to ascending or suberect, scales brown, dull to shiny, lanceolate, sparsely setose on margins and surfaces or glabrescent. **Leaves** several, approximate, (50–)100–200 cm long. **Lamina** chartaceous to subcoriaceous, 1-pinnate-pinnatifid, proximal 5–10 pairs of pinnae abruptly reduced, the lowermost several pairs less than 5 mm long, glanduliform. **Petiole** to 60 cm × 2–6 mm, stramineous to brownish and lacking scales above the base. **Rachis** with moderately dense to dense, spreading, hyaline to reddish trichomes 0.5–2 mm long abaxially. **Pinnae** sessile, 6–16(–25) × 1.5–3(–4) cm, deeply pinnatifid to within 1 mm of costa. **Segments** mostly 3–5 mm wide, proximal ones of larger pinnae slightly reduced and reflexed, overlapping rachis. **Aerophores** tuberculiform. **Buds** lacking. **Veins** 7–20+

pairs per segment, prominent and raised abaxially. **Indument** on costae and costules abaxially of sparse to moderately dense, usually ascending, acicular trichomes 0.5–1 mm, veins and laminar tissue glabrous or nearly so, costal scales subclathrate, ascending, lamina adaxially glabrous on costules, veins, and laminar tissue. **Sori** medial to supramedial, round to oblong, exindusiate, receptacle glabrous, sporangia glabrous.

Cloud forests, 2300–3600 m, San Martín, Pasco, and Cuzco.

Colombia to Bolivia.

This species is closely related to *T. corazonensis*: see the discussion under that species. Other close relatives are *T. rudis* and *T. pilosohispida*.

San Martín: Prov. Mariscal Cáceres, NW corner of Río Abiseo Nat. Park, Chochos valley, *Young 3575* (UC), *3661* (UC, USM), *3685* (UC, USM), *3781* (UC, USM). **Pasco:** Prov. Oxapampa, San Alberto, Cordillera de Yanachaga, *von der Werff et al. 8435* (MO, UC). **Cuzco:** Prov. Paucartambo, Tres Cruces, *Vargas 12212* (F, GH).

33. *Thelypteris caucaensis* (Hieron.) Alston, J. Wash. Acad. Sci. 48: 233. 1958.

Nephrodium caucaense Hieron., Bot. Jahrb. Syst. 34: 444. 1904. LECTOTYPE (chosen by Christensen, 1907): Colombia, Antioquia, Páramo de Ruíz, *Lehmann 3102* (B!; islectotype, BM!).

Dryopteris caucaensis (Hieron.) C. Chr., Index fil. 257. 1905.

Dryopteris millei C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 10: 138. 1913. TYPE: Ecuador, Paluguillo, *Mille 125* (holotype, P; isotype, BM!; photos, UC, US).

Thelypteris millei (C. Chr.) Reed, Phytologia 17: 293. 1968.

Stem short- to long-creeping, scales brown, somewhat shiny, lanceolate, setose on margins and surface. **Leaves** numerous to few, 10–60 cm long. **Lamina** subcoriaceous to coriaceous, 1-pinnate-pinnatifid, proximal 1–3(–4) pairs of pinnae subabruptly reduced, the lowermost 1–5 mm long, sometimes glanduliform. **Petiole** up to 25 cm × 1–2.5 mm, tan to stramineous above the base. **Rachis** glabrescent to moderately pubescent abaxially. **Pinnae** sessile, mostly 2–5 × 0.5–1.5 cm, deeply pinnatifid to within 1 mm of costae, segments 2–3 mm wide. **Aerophores** absent or tuberculiform. **Buds** lacking. **Veins** 3–6 pairs per segment. **Indument** on costae and veins abaxially of sparse to moderately dense, ascending, acicular trichomes mostly 0.3–0.5 mm, laminar tissue gla-

brous or sparsely pubescent, glands lacking, costal scales brown, clathrate or subclathrate, ovate-lanceolate, lamina adaxially glabrous. **Sori** medial to supramedial, round, exindusiate, receptacle glabrous or sometimes with a tuft of trichomes, sporangia glabrous.

Near or above timberline in grassland, (2600–) 3300–4100 m, La Libertad, San Martín, Ancash, Huánuco, and Cuzco.

Guatemala?; Costa Rica; Colombia to Bolivia; Venezuela.

La Libertad: Prov. Sanchez Carrion, señal Huayllides, Laguna Negra, *D. Smith 2282* (F). **San Martín:** Prov. Mariscal Cáceras, Puerta del Monte, *Young 1751* (UC). **Ancash:** W side of mts at Km 311, a few km below Conococha, *Correll & Smith P975* (GH). **Huánuco:** Chavinillo, *Coronado 176*, in part (UC). **Cuzco:** Prov. Paucartambo, Km 130 hacia Kosñipata, *Núñez et al. 8493*, in part (UC).

34. *Thelypteris hutchisonii* A. R. Sm., *sp. nov.*

A speciebus ceteris subg. *Amauropeltae* distinguenda caule late repente, paleis atrocastaneis nitidis non clathratis ad costas abaxialiter, costis venis et spatiis inter venosis abaxialiter dense pubescentibus, e trichomatibus patentibus acicularibus 0.3–1 mm longis, saepe trichomatibus hamatis ad intervenia, lamina atroviridi, indusiis dense setosis.

Stem long-creeping to 25 cm or more, scales dark purple-brown, shiny, lanceolate, setose on margins and surface. **Leaves** few, distant to approximate, 75–100 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal 4–7 pairs of pinnae subabruptly reduced, the lowermost 2 mm long or less. **Petiole** ca. 25 cm × 2–4 mm, brown to tan above the base, lacking scales above the base. **Rachis** with dense trichomes 0.1–1 mm abaxially. **Pinnae** sessile, largest 8–10 × 1.3–1.8 cm, deeply pinnatifid to ca. 1 mm from costae, segments 2.5–4 mm wide. **Aerophores** lacking. **Buds** lacking. **Veins** 7–10 pairs per segment. **Indument** on costae, veins, and laminar tissue abaxially of dense, spreading, acicular trichomes mostly 0.3–1 mm, some laminar trichomes hamate, glands lacking, costal scales castaneous, not clathrate, lanceolate, shiny, lamina adaxially with numerous ascending trichomes 0.3–1.0 mm on costules, veins, and laminar tissue. **Sori** supramedial to inframarginal, round, indusia densely setose, receptacle glabrous, sporangia glabrous.

TYPE—Peru, Amazonas, Prov. Chachapoyas, Cerros Calla Calla, W side, 45 km above Balsas midway on road to Leimebamba, *Hutchison & Wright 5828* (holotype, UC!; isotypes, F!, GH!, NY!, USM!).

Rocky terrain, 3100–3400 m, known only from Prov. Amazonas in Peru.

In aspect, this is most similar to *T. pilosula* but bears dark-castaneous scales on the costae abaxially. It has characteristics of both sect. *Uncinella* (hamate trichomes, indusia) and sect. *Lepidoneuron* (costal scales, creeping rhizome), and I am uncertain of its sectional placement.

Amazonas: Prov. Chachapoyas, Calla-Calla, *Aguado [Herb. Truxillensis 6788]* (F).

35. *Thelypteris concinna* (Willd.) Ching, Bull. Fan Mem. Inst. Biol., Bot. 10: 251. 1941.

Polypodium concinnum Willd., Sp. pl. ed. 4, 5: 201.

1810. **TYPE:** Venezuela, Caracas, *Bredemeyer* (holotype, B, *Herb. Willd. 19698*).

Dryopteris concinna (Willd.) Kuntze, Rev. gen. pl. 2: 812. 1891.

Amauropelta concinna (Willd.) Pic.-Ser., Webbia 31: 251. 1977.

Stem ascending to erect, scales brown, dull, appressed, ovate-lanceolate, glabrous on margins and surface. **Leaves** few to many, clustered, 45–110 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal 7–12 pairs of pinnae gradually reduced, the lowermost 1 mm long or less, sometimes glanduliform. **Petiole** 5–15 cm × 1.5–4 mm, purplish brown to brownish and scaleless above the base. **Rachis** commonly with dense trichomes 0.05–0.1 mm abaxially. **Pinnae** sessile, 4–10 × 0.8–2.0 cm, deeply pinnatifid to within 1 mm of costae, segments 2–3 mm wide. **Aerophores** lacking. **Buds** lacking. **Veins** 6–10 pairs per segment. **Indument** on costae and veins abaxially of dense, spreading trichomes 0.5–2.0 mm, laminar tissue glabrous, glands lacking, costal scales lacking, lamina adaxially with numerous adpressed trichomes 0.05–0.1 mm on costules, veins, and laminar tissue, occasionally glabrescent. **Sori** supramedial, round, exindusiate, receptacle glabrous or setulose, sporangia with trichomes 0.05–1.0 mm on capsule.

Along streambanks, roadbanks, and edges of montane forests, 500–2150 m, common in Peru: Lambayeque, Cajamarca, San Martín, Huánuco, Pasco, Junín, Ucayali, Ayacucho, and Cuzco.

Antilles; Mexico to Panama; Colombia to northwestern Argentina; Venezuela.

Lambayeque: Prov. Lambayeque, road to Kerguer, Penachi, *Quiroz 1474* (F). **Cajamarca:** Prov. Cutervo, Cutervo-Sócota, *López & Sagástegui 5332* (GH). **San Martín:** Mariscal Caceres, 60 km NE of Tingo María, *Tryon & Tryon 5266* (F, GH, USM). **Huánuco:** Prov. Huánuco, Dist. Churubamba, Hda. Exito, slope of Río Ysabel, *Mexia 8184* (F, GH, UC). **Pasco:** Prov. Oxapampa, Canyon de Huancabamba, *León 675* (F, USM). **Junín:** Carpapata, *Kunkel 611* (GH). **Ucayali:** Road to Aguaytía, Km 209, *Ridout* (GH, USM). **Ayacucho:** Ayna, between Huanta and Río Apurímac, *Killip & Smith 22807* (GH). **Cuzco:** La Convención, Potrero, 8 km W of Quillabamba, *Tryon & Tryon 5386* (GH).

36. *Thelypteris loretensis* A. R. Sm., sp. nov.

Inter species subg. *Amauropeltae* sect. *Blepharithecae* ob sporangia minute setulosa et trichomata similia 0.05–0.1 mm longa *T. concinna* proxima sed differt pinnis profundius incisis, segmentis obliquioribus costis comparatis, frondibus minoribus, glandibus resinosis dispersis ad laminam abaxialiter, trichomatibus plerumque minus numerosis ad laminam abaxialiter dispositis.

Stem ascending, scales brown, dull, appressed, ovate-lanceolate, glabrous on margins and surface. **Leaves** few to many, clustered, 35–40 cm long. **Lamina** thin-chartaceous, deeply 1-pinnate-pinnatifid, proximal 3–4 pairs of pinnae subabruptly reduced, the lowermost 2–8 mm long, not glanduliform. **Petiole** 5–10 cm × 1–2 mm, tan to stramineous and lacking scales above the base. **Rachis** with moderate spreading trichomes 0.05–0.1 mm abaxially. **Pinnae** sessile, 4–6 × 0.9–1.2 cm, deeply pinnatifid to within 0.5 mm of costae, or the basal pair incised to costa and free, segments 1.5–2 mm wide. **Aerophores** lacking. **Buds** lacking. **Veins** 6–8 pairs per segment. **Indument** on costae and veins abaxially of moderately dense to dense, spreading trichomes 0.05–0.1 mm, laminar tissue with numerous reddish, sessile, resinous glands, costal scales lacking, lamina adaxially glabrous or veins with sparse adpressed trichomes 0.05–0.1 mm. **Sori** supramedial, round, exindusiate, receptacle glabrous, sporangia minutely setulose, trichomes 0.05–0.1 mm.

TYPE—Peru, Loreto, above Pongo de Manseriche, right bank of Río Santiago, *Mexia 6211* (holotype, UC!; isotypes, BH!, F!, GH!, MICH!, MO!, US!).

Among rocks in damp sand, abundant locally, 200 m, Loreto.

Known only from the type.

This species was recognized as distinct by Maxon but has remained unpublished until now; I use Maxon's epithet from the original labels. *Thelypteris loretensis* is most closely related to *T. concinna*, from which it differs in the more deeply incised pinnae, more oblique segments, smaller fronds, presence of scattered, sessile, resinous glands on the abaxial lamina, generally sparser (but similar) trichomes on the costae abaxially, and absence or scarcity of trichomes on the lamina abaxially. *Thelypteris concinna* occurs at higher elevations and has not yet been found in Loreto.

37. *Thelypteris deflexa* (Presl) R. Tryon, *Rhodora* 69: 5. 1967.

Nephrodium deflexum Presl, *Reliq. haenk.* 1: 36, t. 5, f. 2. 1825. **TYPE:** Peru, near Huánuco, *Haenke* (holotype, PR).

Dryopteris lindigii C. Chr., *Index fil.* 275. 1905. Based on *Nephrodium deflexum* Presl, not *Dryopteris deflexa* (Kaulf.) C. Chr.

Dryopteris assurgens Maxon, *J. Wash. Acad. Sci.* 34: 24. 1944. **TYPE:** Peru, [Huánuco], Playapampa, *Macbride 4517a* (holotype, F!; photos, GH, MO; isotypes, F!, US!).

Thelypteris lindigii (C. Chr.) Alston, *J. Wash. Acad. Sci.* 48: 233. 1958.

Thelypteris assurgens (Maxon) R. Tryon, *Rhodora* 69: 5. 1967.

Amauropelta deflexa (Presl) Löve & Löve, *Taxon* 26: 325. 1977.

Stem suberect to erect, caudex up to 15+ cm long, scales brown, dull to shining, appressed, ovate, glabrous on margins and surface. **Leaves** clustered, 30–100(–120) cm long. **Lamina** herbaceous to chartaceous, deeply 1-pinnate-pinnatifid, proximal 2–4(–6) pairs of pinnae gradually to subabruptly reduced, the lowermost 2–8 mm long, often auriculiform. **Petiole** 6–12 cm × 1–3 mm, stramineous and lacking scales above the base. **Rachis** glabrous abaxially. **Pinnae** sessile, opposite to subopposite, 3–10 × 0.7–2 cm, deeply pinnatifid to within 1.5 mm of costae, segments 2–3 mm wide. **Aerophores** lacking. **Buds** lacking. **Veins** 4–8 pairs per segment. **Indument** on costae, veins, and laminar tissue abaxially lacking or of sparse trichomes 0.2–0.4 mm on costae and costules, costal scales lacking, lamina adaxially glabrous or sparsely pubescent along veins. **Sori** inframedial to medial, round, exindusiate, receptacle and sporangia glabrous.

Montane forests, cloud forests, 1800–3200 m, La Libertad, Huánuco, Pasco, and Junín.

Southern Mexico to Panama; Colombia to Peru; Venezuela.

Dryopteris sellensis C. Chr., from Hispaniola, may also be conspecific.

La Libertad: Ca. 3 km W of Huamachuco, *Correll & Smith P939* (GH). Prov. Huamachuco, Yanac, *Sagástegui 4533* (GH). **Huánuco:** Carpis Divide, *Sandeman 5078* (BM). Carpish, *Coronado 72* (GH, UC). **Pasco:** Prov. Oxapampa, San Alberto, Cordillera de Yanachaga, *van der Werff et al. 8493* (UC). **Junín:** Prov. Chanchamayo, Río Rondayaco, 45 km from San Ramón, *D. Smith et al. 2613* (F).

38. *Thelypteris pachyrhachis* (Mett.) Ching, Bull. Fan Mem. Inst. Biol., Bot. 10: 253. 1941, var. **bogotensis** (C. Chr.) Alston, J. Wash. Acad. Sci. 48: 233. 1958.

Nephrodium crassipes Sodiro, Anales Univ. Centr. Ecuador 9(64): 323. 1893 [Crypt. vasc. Quit. 234. 1893]. TYPE: Ecuador, along road Quito-Manabí, *Sodiro* (possible isotype, US!).

Dryopteris pachyrhachis (Mett.) Kuntze var. *bogotensis* C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 4: 306. 1907. LECTOTYPE (chosen here): Colombia, Manganos, *Lindig 296* (B!).

Stem erect, scales brown, dull to somewhat shiny, ovate-lanceolate, glabrous on margins and surface. **Leaves** few, clustered, mostly 100–200 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal 5–10 pairs of pinnae gradually to subabruptly reduced, the lowermost 2–10 mm long, often hastate. **Petiole** 8–20(–50) cm × 4–10 mm, stramineous to brownish above the base, sometimes mucilaginous. **Rachis** glabrescent or with trichomes abaxially. **Pinnae** sessile, mostly 10–20 × 1.5–3 cm, deeply pinnatifid 1–2 mm from costa. **Aerophores** scalelike or peglike, to ca. 1 mm. **Buds** lacking. **Veins** 7–14 pairs per segment. **Indument** on costae and veins abaxially lacking or of moderately dense, spreading, flattened trichomes mostly 0.5–1 mm, also often with numerous yellowish to orangish, sessile, resinous glands on laminar tissue, costal scales tan to brownish, amorphous, appressed, lamina adaxially glabrous or with scattered, acicular trichomes 0.5–0.8 mm on costules, veins, and laminar tissue. **Sori** medial, round, indusia ca. 1 mm in diameter, persistent, glabrous or with sessile glands and trichomes to 0.5 mm, receptacle and sporangia glabrous.

Montane forests, edge of streams, 2200–2750 m, Cajamarca, Amazonas, Pasco, and Cuzco.

Costa Rica to Peru.

Specimens cited from Amazonas and Pasco are atypical in lacking glands but do not seem to be the same as var. *sprucei* (Baker) A. R. Sm. (Colombia and Ecuador), which also lacks glands. In aspect, they seem closer to var. *pachyrhachis* (Costa Rica to Bolivia and southern Brazil, Greater Antilles), which generally has laminar glands. This species group is in particular need of revision.

Cajamarca: Prov. Cutervo, Grutas de San Andrés, *Llatas Quiroz & Suarez C. 2738* (F). **Amazonas:** Prov. Bagua, Cordillera Colán SE of La Peca, *Barbour 4107* (MO, USM). **Pasco:** Prov. Oxapampa, 2–4 km N of Mallampampa, *D. Smith & Canne 5825, 5826* (UC). **Cuzco:** Prov. Paucartambo, entre Pillahuata y La Esperanza, *León 2221* in part (UC, USM).

39. *Thelypteris balbisii* (Sprengel) Ching, Bull. Fan Mem. Inst. Biol., Bot. 10: 250. 1941.

Polypodium balbisii Sprengel, Nova Acta Acad. Caes. Leop. Carol. German. Nat. Cur. 10: 228. 1821. NEOTYPE (chosen by Proctor, Fl. Less. Antill. 2: 281. 1977): Dominica, *Hodge & Hodge 1203* (GH).

Aspidium sprengelii Kaulf., Flora 6: 365. 1823, *nom. superfl.*, see Morton, Amer. Fern J. 53: 62. 1963.

TYPE: Same as for *Polypodium balbisii* Sprengel. *Dryopteris sprengelii* (Kaulf.) Kuntze, Rev. gen. pl. 2: 813. 1891.

Dryopteris balbisii (Sprengel) Urban, Symb. antill. 4: 14. 1903.

Dryopteris mercurii Hieron., Hedwigia 46: 335, t. 5, f. 9. 1907. LECTOTYPE (chosen here): Colombia, Santa Marta, *Stübel 363* (B!).

Thelypteris sprengelii (Kaulf.) Proctor, Bull. Inst. Jamaica, Sci. Ser. 5: 65. 1953.

Thelypteris mercurii (Hieron.) Reed, Phytologia 17: 292. 1968.

Stem ascending to erect, scales brown, somewhat shiny, ovate-lanceolate, glabrous on margins and surface. **Leaves** few, clustered, 50–100 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal ca. 10 pairs of pinnae gradually to subabruptly reduced, the lowermost 5 mm long or less, sometimes glanduliform, often hastate. **Petiole** 3–5 cm × 2–6 mm, tan to stramineous above the base, with scattered, appressed scales. **Rachis** glabrescent or with flexuous, septate trichomes, sometimes with short-stipitate glands abaxially. **Pinnae** sessile, 10–15 × 1.8–2.5 cm, deeply pinnatifid to within 1 mm of costae. **Aerophores** tuberculiform or peglike, to 0.5 mm. **Buds** lacking. **Veins** 10–16

pairs per segment. **Indument** on costae and veins abaxially of moderately dense to dense, spreading or flexuous, acicular and often septate trichomes mostly 0.5–2.0 mm, sometimes with shorter unicellular trichomes 0.2–0.3 mm on laminar tissue, also with numerous reddish to yellowish, sessile, resinous glands on laminar tissue, costal scales lacking, lamina adaxially glabrescent or with numerous ascending acicular trichomes 0.1–0.2 mm on costules, veins, and laminar tissue. **Sori** medial to supramedial, round, indusia with reddish to yellowish sessile glands and lacking trichomes, receptacle glabrous, sporangia glabrous.

Moist banks and along streams and trails, 250–300 m, San Martín, Huánuco, and Cuzco.

Antilles; southern Mexico to Panama; Colombia to Peru; Venezuela.

San Martín: Tulumayo, on Río Tulumayo, 23 km from Tingo María on hwy to Pucallpa, *Allard 22269* (GH). **Huánuco:** Prov. Huánuco, Tingo María, valley of Río Huallaga, “7000” ft [probably erroneous, perhaps 1000 ft], *Belshaw 3066* (F, GH, MICH, UC). **Cuzco:** Prov. La Convención, ca. 4 km NE from Hda. Luisiana and Apurímac River, *Dudley 11461* (GH). Río Tambopata, near Puerto Maldonado, *Núñez 6484* (MO).

40. *Thelypteris opposita* (Vahl) Ching, Bull. Fan Mem. Inst. Biol., Bot. 10: 251. 1941.

Polypodium oppositum Vahl, Eclog. amer. 3: 53. 1807.

TYPE: Montserrat, *Ryan* (holotype, c?, not found; isotype, BM).

Aspidium conterminum Willd., Sp. pl. ed. 4, 5: 249. 1810. TYPE: Martinique, collector not known (holotype, B, *Herb. Willd.* 19698).

Polypodium rivulorum Raddi, Pl. bras. 1: 23, t. 35. 1825. TYPE: Brazil.

Aspidium coarctatum Kunze, Bot. Zeit. (Berlin) 1845: 287. 1845. TYPE: Venezuela, Caracas, *Moritz 80* (holotype, B; isotype, BM!).

Dryopteris contermina (Willd.) Kuntze, Rev. gen. pl. 2: 812. 1891.

Dryopteris coarctata (Kunze) C. Chr., Index fil. 258. 1905.

Dryopteris rivulorum (Raddi) Hieron., Hedwigia 46: 334. 1907.

Dryopteris leucothrix C. Chr., Smithsonian Misc. Collect. 52: 377. 1907. TYPE: Bolivia, near Yungas, *Rusby 432* (holotype, US!).

Thelypteris coarctata (Kunze) R. Tryon, Rhodora 69: 5. 1967.

Thelypteris leucothrix (C. Chr.) R. Tryon, Rhodora 69: 6. 1967.

Thelypteris contermina (Willd.) Reed, Phytologia 17: 269. 1968.

Amauropelta opposita (Vahl) Pic.-Ser., Webbia 31: 251. 1977.

Amauropelta rivulorum (Raddi) Pic.-Ser., Webbia 31: 251. 1977.

Stem suberect to erect, short, scales brown, dull, appressed, ovate-lanceolate, glabrous on margins and surface. **Leaves** few to many, clustered, mostly (15–)40–110 cm long. **Lamina** chartaceous to subcoriaceous, deeply 1-pinnate-pinnatifid, proximal 10–20 pairs of pinnae very gradually reduced, the lowermost 1–5 mm long, often hastate. **Petiole** 1–10 cm × 1–4 mm, stramineous to brownish and lacking scales above the base. **Rachis** with moderately dense to dense, crispate trichomes 0.3–0.8 mm abaxially. **Pinnae** sessile, (1.5–)3–9 × 0.5–1.8 cm, pinnatifid to 1–2 mm from costae, segments (1–)2–4 mm wide, margins strongly revolute. **Aerophores** lacking or weakly developed. **Buds** lacking or weakly developed. **Veins** mostly 3–7 pairs per segment. **Indument** on costae, veins, and sometimes laminar tissue abaxially of moderately dense to dense, acicular or crispate trichomes mostly 0.2–0.6 mm, also with numerous yellowish to orangish shiny sessile resinous glands on veins and laminar tissue, costal scales lacking, lamina adaxially glabrous or usually with scattered trichomes 0.1–0.3 mm. **Sori** medial to supramedial, round, indusia tan, 0.5–0.7 mm in diameter, glandular on margin, sometimes also with a few short trichomes, sporangia and receptacle glabrous.

Lowland and montane forests, especially along roads, trails, streams, and ditches, 100–1100 (–1800) m, Amazonas, San Martín, Loreto, Huánuco, Pasco, Junín, Ucayali, Ayacucho, Cuzco, and Puno.

Puerto Rico; Lesser Antilles; Costa Rica and Panama; Colombia to Bolivia; Venezuela; southern Brazil.

This is by far the most common *Thelypteris* of subg. *Amauropelta* in the lowlands of Peru. It may grow in partial or full sun or shade, and exhibits a variety of textures and sizes; it is also variable in the density of the trichomes on the lamina and axes, but the trichomes are often crispate or twisted, especially along the rachis and costae abaxially. *Foster et al. 3005* is unusual in the small leaf size (15 × 4 cm) and more pubescent adaxial lamina.

Amazonas: Prov. Bagua, Ribera derecha del Marañón, *López et al. 4162* (GH). **San Martín:** Prov. Lamas, Dist. Lamas, below English Evangelical Mission, Lamas, *Belshaw 3425* (F, GH, UC). **Loreto:** Pumayacu, between Balsapuerto and Moyobamba, *Klug 3245* (F, G, GH, NY). **Huánuco:** Prov. Huánuco, Dist. Churubamba, Hacienda Exito, Río Ysabel, *Mexia 8138* (F, GH, UC, USM). **Pasco:**

Prov. Oxapampa, Palcazu valley on Río Palcazú between Iscozacín and San Juan de Chuchurras, *D. Smith 3926* (UC). **Junín:** La Merced, *Killip & Smith 23680* (GH). **Ucayali:** Bosque von Humboldt Experimental Station, Km 86 on Pucallpa–Tingo María road, *D. Smith 1224* (F, MO, UC). **Ayacucho:** Prov. La Mar, Hacienda Luisiana, *Dudley 10006* (GH). **Cuzco:** Prov. La Convención, near Camp Zero, ca. 4 km NE from Hacienda Luisiana and Apurímac River, *Dudley 11462* (GH). **Prov. Paucartambo,** Atalaya, *R. Foster et al. 3005* (GH). **Puno:** Prov. Sandia, Asalaya, *Vargas 14828* (GH).

41. *Thelypteris micula* A. R. Sm., *sp. nov.*

Inter species subg. *Amauropeltae* sect. *Amauropeltae* e glandibus resinosis ad laminam indusiumque, soris indusiatis, pinnis proximalibus gradatim reductis *T. oppositam* proxima sed differt frondibus minoribus, membranaceis, 8–20 cm longis, pinnis usque ad 1.2×0.4 cm, segmentorum venis 1–2-jugis, lamina adaxialiter dense pubescente trichomatibus 0.1–0.2 mm.

Stem erect, scales brown, somewhat shiny, lanceolate, 1–2 mm long, glabrous on margins and surface. **Leaves** few, clustered, ca. 8–20 cm long. **Lamina** thin-chartaceous, 1-pinnate-pinnatifid, proximal 5–6 pairs of pinnae very gradually reduced, the lowermost ca. 1 mm long, not glanduliform. **Petiole** 2–3 cm \times 0.5 mm, tan and lacking scales above the base. **Rachis** with trichomes mostly 0.2–0.4 mm abaxially. **Pinnae** sessile, 0.8–1.2 \times 0.3–0.4 cm, shallowly pinnatifid less than 1 mm from margin, segments ca. 1.5 mm wide, broader than long. **Aerophores** lacking. **Buds** lacking. **Veins** 1–2 pairs per segment, or merely forked or simple toward apex. **Indument** on costae, veins, and laminar tissue abaxially of moderately dense to dense, spreading, acicular trichomes mostly 0.1–0.3 mm, also with reddish sessile, resinous glands on laminar tissue, costal scales lacking, lamina adaxially with dense spreading or ascending trichomes 0.1–0.2 mm on costules, veins, and laminar tissue. **Sori** medial to supramedial, round, indusia with reddish sessile glands and sparse trichomes 0.1 mm, receptacle glabrous, sporangia glabrous.

TYPE—Peru, Junín, Chanchamayo Valley, *C. Schunke 848* (holotype, F!).

Habitat unknown, 1500 m, known only from the type.

This species is probably most closely related to *T. opposita*, but differs in the small, very thin-textured fronds and dense, short trichomes (0.1–0.2 mm) on the adaxial surface of the lamina.

42. *Thelypteris dudleyi* A. R. Sm., *sp. nov.*

A speciebus ceteris subg. *Amauropeltae* distinguenda caulibus paleis glabris ovato-lanceolatis, foliis parvis 25–65 cm longis, glandibus ad laminam abaxialiter abundantibus sessilibus vel brevistipitatis, paleis paucis atrobrunneis usque ad 1 mm longis ad costam, indusiis glandiferis 0.2–0.3 mm diametro.

Stem ascending to erect, scales brown, dull to somewhat shiny, ovate-lanceolate, glabrous on margins and surface. **Leaves** few to numerous, clustered, 25–65 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal 5–7 pairs of pinnae subabruptly reduced, the lowermost 1 mm long or less, sometimes glanduliform. **Petiole** 4–6 cm \times 1–2 mm, tan and lacking scales above the base. **Rachis** glabrous or with trichomes 0.2–0.3 mm abaxially, sometimes with short-stipitate glands 0.1 mm. **Pinnae** sessile, 2–8 \times 0.6–1.5 cm, deeply pinnatifid to within 1 mm of costae, segments 1–2.5 mm wide. **Aerophores** tuberculiform. **Buds** lacking. **Veins** 4–7 pairs per segment. **Indument** on costae abaxially of sparse to moderately dense, slightly ascending, acicular trichomes mostly 0.15–0.4 mm, veins and laminar tissue lacking trichomes, but with numerous orangish to yellowish, sessile, resinous or short-stipitate glands, costal scales dark-castaneous, to 1 mm, lamina adaxially with adpressed trichomes 0.1–0.2 mm on costules, veins, and laminar tissue, also with sessile glands. **Sori** suprasedial, round, indusia 0.2–0.3 mm wide, glandular, lacking trichomes, receptacle and sporangia glabrous.

TYPE—Peru, Cuzco, Prov. La Convención, between camp 4 and 5, *T. R. Dudley 10783* (holotype, GH!; isotypes, F!, MO!, USM!).

Common colonizer in full sun on open landslide, 2200–2825 m, Cuzco.

This species has the laminar aspect of *T. deflexa* but differs from that species in the presence of a small indusium, abundant sessile glands on the abaxial lamina, and more numerous reduced proximal pinna-pairs. It is also similar to *T. arena* A. R. Sm. from Ecuador and Venezuela, but differs in the weakly ascending or short-erect rhizome (vs. trunklike and long-erect), smaller indusium, and ovate, glabrous petiole base scales. The collector described the petioles as “purplish-black and glossy,” but this appears to be true only at the base. There are a few castaneous scales on the costae abaxially, but it does not seem likely that these indicate an affinity with sect. *Lepidoneuron*.

The sessile laminar glands suggest that this may be a member of sect. *Amauropelta*, but this is uncertain. *Pennell 13942* agrees with the type in the glands but differs in being more sparsely pubescent, with larger fronds and larger indusia; it lacks scales on the abaxial costae.

Cuzco: Pillahuata, Cerro de Cusilluyoc, *Pennell 13942* (GH, NY).

43. *Thelypteris cheilanthoides* (Kunze) Proctor, Bull. Inst. Jamaica, Sci. Ser. 5: 58. 1953.

Aspidium cheilanthoides Kunze, Linnaea 22: 578. 1849. TYPE: Brazil, *Regnell* (type material, s).

Lastrea cheilanthoides (Kunze) T. Moore, Index fil. 88. 1858.

Nephrodium resinosofoetidum Hooker, Sp. fil. 4: 105. 1862. LECTOTYPE (chosen by Christensen, 1913): Ecuador, Tunguragua, *Spruce 5300* (κ, 2 sheets!).

Dryopteris resinosofoetida (Hooker) Kuntze, Rev. gen. pl. 2: 813. 1891.

Dryopteris cheilanthoides (Kunze) C. Chr., Index fil. 257. 1905.

Dryopteris cheilanthoides var. *resinosofoetida* (Hooker) C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 4: 331. 1907.

Thelypteris resinosofoetida (Hooker) Ching, Bull. Fan. Mem. Inst. Biol., Bot. 10: 254. 1941.

Dryopteris densa Maxon, J. Wash. Acad. Sci. 34: 25. 1944. TYPE: Peru, [Huánuco], Huacachi, near Muña, *Macbride 4175* (holotype, F, 2 sheets!; isotype, us!).

Thelypteris cheilanthoides var. *resinosofoetida* (Hooker) Proctor, Bull. Inst. Jamaica, Sci. Ser. 5: 58. 1953.

Thelypteris densa (Maxon) R. Tryon, Rhodora 69: 5. 1967.

Amauropelta cheilanthoides (Kunze) Löve & Löve, Taxon 26: 325. 1977.

Stem suberect to erect, scales brown, dull to shiny, subappressed, ovate-lanceolate, glabrous on margins and surface. **Leaves** several, clustered, mostly 65–250 cm long, usually mucilaginous when coiled or young. **Lamina** subcoriaceous to coriaceous, deeply 1-pinnate-pinnatifid, proximal 4–7 pairs of pinnae subabruptly reduced, the lowermost 1–5 mm, glanduliform. **Petiole** 10–100 cm × 4–10 mm, brownish to tan, densely scaly in proximal third, lacking scales distally. **Rachis** glabrescent to pubescent with trichomes 0.3–2 mm long abaxially. **Pinnae** sessile, 10–32 × 1.5–4 cm, deeply pinnatifid to within 1–2(–3) mm of costae, segments ca. 3–4 mm wide, margin often strongly revolute. **Aerophores** peglike to scalelike, to 2 mm long or more, smaller ones sometimes present at

base of costules. **Buds** lacking. **Veins** 12–24(–30) pairs per segment, usually immersed and appearing dark in dried specimens. **Indument** on costae and veins abaxially lacking or of moderately dense to dense simple to pluricellular, acicular or crispate trichomes 0.2–2 mm, costae also with a few stramineous to tan, amorphous appressed scales, laminar tissue abaxially glabrous, pubescent, or with sessile yellowish to orangish glands, lamina adaxially glabrous or with sparse trichomes to 0.3 mm on veins and laminar tissue. **Sori** supramedial to submarginal, round, confluent at maturity, indusia often large, subthyrioid, persistent, sometimes glandular on margin, receptacle and sporangia glabrous.

Montane rain forests, along streams and trails, (400–)1000–3500 m, Cajamarca, Amazonas, San Martín, Loreto, Huánuco, Pasco, Junín, and Cuzco.

Jamaica; Hispaniola; Mexico to Panama; Colombia to Bolivia; Venezuela; southern Brazil.

Cajamarca: Prov. San Miguel, La Toma, Niepos, *Llantas Quiroz 1583* (F). **Amazonas:** Caño Santa Lucía E of Chachapoyas, *Wurdack 741* (F, GH, UC, USM). **San Martín:** Prov. Lamas, Dist. Lamas, 2–4 km N of San Antonio, along Río Cumbasa, *Belshaw 3545* (GH, UC). **Loreto:** Pumayacu, between Balsapuerto and Moyobamba, *Klug 3231* (F, GH). **Huánuco:** Carpish, between Huánuco and Tingo María, *Ferreyra 1836* (GH, USM). **Pasco:** Prov. Oxapampa, Río El Tunquí, *D. Smith & Alban 5541* (F). **Junín:** Chanchamayo Valley, *Schunke 15* (F), 62 (F). **Cuzco:** Prov. La Convención, Río Apurímac, mouth of Río Pampaconas, above Sinechinete, *Davis et al. 1287* (GH).

44. *Thelypteris furfuracea* A. R. Sm., *sp. nov.*

Inter species subg. *Amauropeltae* sect. *Blennocaulonis* indusii usque ad 1 mm diametro, venis immersis, aerophoris elongatis *T. cheilanthoidem* (Kunze) Proctor approximans sed differt paleis bicoloribus ad rhachim et costas abaxialiter occurrentibus, paleis corpore castaneo et marginibus fulvis albidisve, trichomatibus non septatis 0.2–0.4 mm longis abaxialiter ad costas occurrentibus.

Stem not seen, probably ascending to erect, scales dark brown and shiny with narrow pale margins, linear-lanceolate to 1 cm, glabrous on margins and surface. **Leaves** ca. 50 cm long. **Lamina** subcoriaceous, 1-pinnate-pinnatifid, proximal ca. 7 pairs of pinnae subabruptly reduced, the lowermost 1 mm long or less, glanduliform. **Petiole** 5–10 cm × 3–4 mm, brownish and with a few scales above the base. **Rachis** with curved or crispate trichomes

to 0.2–0.5 mm and scattered scales abaxially. **Pinnae** sessile, 4–7 × 1.0–1.4 cm, deeply pinnatifid to within 1 mm of costae, segments 2–3 mm wide, strongly inrolled at margin. **Aerophores** peglike, to 1 mm. **Buds** lacking. **Veins** 8–10 pairs per segment, sunken and darkened abaxially. **Indument** on costae abaxially of moderately dense to dense, curved or crispate trichomes mostly 0.2–0.4 mm, glands lacking, costal scales numerous, castaneous with pale margins, lanceolate, 1–3 mm long, lamina adaxially glabrescent or with sparse, crispate trichomes 0.1–0.2 mm on laminar tissue, also sometimes with sessile glands. **Sori** medial, round, indusia to 1 mm, minutely glandular at margin and lacking trichomes, receptacle and sporangia glabrous.

TYPE—Peru, Amazonas, Prov. Chachapoyas, 20–17 km down E slope of Cerro Calla-Calla, *Edwin & Schunke 3674* (holotype, F!; isotypes, GH!, NY!).

Along roadside, middle elevation, known only from the type.

This species differs from other members of sect. *Blennocaulon* (*T. cheilanthoides* group) by the bicolorous scales along the rachis and costae abaxially. The scales are castaneous with a narrow tan or whitish margin. Specimens lack long-septate trichomes found in most specimens of *T. cheilanthoides*.

45. *Thelypteris ruiziana* (Klotzsch) A. R. Sm., *comb. nov.*

Polypodium ruizianum Klotzsch, *Linnaea* 20: 385. 1847. TYPE: Peru, Huánuco, ad Panatahua, *Herb. Ruiz no. 70* (holotype, B!; frag., BM!).

Dryopteris ruiziana (Klotzsch) C. Chr., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 10: 152. 1913.*

Stem probably suberect to erect, scales brown to tan, dull, appressed, cellular detail not evident at 30×, ovate-lanceolate, glabrous on margins and surface. **Leaves** several, clustered, 130–170 cm long, probably not mucilaginous when young. **Lamina** subcoriaceous, deeply 1-pinnate-pinnatifid, proximal pinnae not seen, probably subabruptly reduced and the lowest glanduliform. **Petiole** ca. 30 cm × 4 mm, tan and with scattered appressed scales distally. **Rachis** with numerous septate trichomes 1–1.5 mm long abaxially. **Pinnae** sessile, 14 × 1.5 cm, deeply pinnatifid to within 1 mm of costae, segments ca. 2–3 mm wide, margin often

strongly revolute, basispic segment of larger pinnae often longer and more curved. **Aerophores** small, tuberculiform. **Buds** lacking. **Veins** ca. 15 pairs per segment, usually immersed and appearing dark in dried specimens. **Indument** on costae and veins abaxially of moderately dense to dense, septate trichomes 0.5–1 mm, costae also with numerous light tan, amorphous, appressed scales, laminar tissue glabrous, lamina adaxially glabrous. **Sori** medial, oblong, strongly confluent at maturity, exindusiate, receptacle and sporangia glabrous.

Montane forest, along roadsides, 1900 m, Huánuco.

Perhaps also Ecuador.

Huánuco: Huacachi, near Muña, *Macbride 4177* (F).

46. *Thelypteris nitens* (Desv.) R. Tryon, *Rhodora* 69: 7. 1967.

Polypodium nitens Desv., *Mém. Soc. Linn. Paris* 6: 240. 1827. TYPE: Peru, collector not known (holotype, P!; photos, GH, UC; frag., BM!).

Dryopteris nitens (Desv.) C. Chr., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 10: 142. 1913.*

Dryopteris multiformis C. Chr., *Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 10: 142. 1913.* TYPE: Ecuador, Mt. Pichincha, *Mille* (holotype, P; isotype, UC!).

Lastrea nitens (Desv.) Copel., *Gen. fil.* 139. 1947.
Thelypteris multiformis (C. Chr.) Reed, *Phytologia* 17: 294. 1968.

Stem ascending to erect, scales brown, dull, ovate to lanceolate, glabrous on margins and surface. **Leaves** few, 30–75(–100) cm long. **Lamina** thick-chartaceous, 1-pinnate-pinnatifid (sometimes 2-pinnate in Ecuador), proximal 1–3(–6) pairs of pinnae abruptly reduced, the lowermost often less than 1 mm, glanduliform. **Petiole** 15–30 cm × 2–5 mm, stramineous and scaleless above the base. **Rachis** glabrescent or deciduously pubescent with flexuous, septate trichomes 1–2 mm abaxially. **Pinnae** sessile, 9–15(–20) × (1.3–)2–3(–6) cm, opposite to subopposite, pinnatifid to ca. 1(–3) mm from costae, segments 4–6(–8) mm wide, the basal basispic ones sometimes enlarged and dentate. **Aerophores** absent or tuberculiform. **Buds** lacking. **Veins** 6–12(–16) pairs per segment. **Indument** of costae and veins abaxially of moderate spreading or flexuous, acicular and often septate trichomes mostly 1–2 mm, laminar tissue glabrous, glands lacking, costal scales light brown, appressed,

amorphous, lamina adaxially glabrous. **Sori** medial, round to slightly oblong, exindusiate, receptacle and sporangia glabrous.

Montane rain forests and cloud forests, wet cliffs, 2200–3450 m, Cajamarca and Cuzco.

Ecuador and Peru.

Some specimens from Ecuador are much larger than those from Peru and may even be 2-pinnate with the pinnules auriculate or hastate at their base.

Cajamarca: Prov. Contumazá, Quebrada de Canrra (Contumazá–Toledo), *Sagástegui et al. 12617* (MO). **Cuzco:** Prov. Urubamba, bottom of Pojpoj waterfall, *Davis et al. 1740* (F), *1788* (F), *1797* (F). Prov. Urubamba, Yucay, *Herrera 713* (US, frag. GH).

47. *Thelypteris proboscidea* A. R. Sm., *sp. nov.*

A speciebus ceteris subg. *Amauropeltae* distinguenda caulibus paleis glabris, costae paleis fulvis non clathratis, aerophoris elongatis usque ad 3 mm longis ad basin pinnarum, soris exindusiatis, petiolo et rhachide et costis abaxialiter sparsim pubescentibus vel glabris, lamina glandulosa abaxialiter.

Stem ascending to erect, scales brown, somewhat shiny, ovate-lanceolate, glabrous on margins and surface. **Leaves** few, clustered, 60–90 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal ca. 5 or more pairs of pinnae abruptly reduced, the lowermost 1 mm long or less, glanduliform. **Petiolo** ca. 5–15 cm × 2–5 mm, tan to stramineous and lacking scales above the base. **Rachis** glabrous or very sparsely pubescent. **Pinnae** sessile, 8–15 × 1.5–2.3 cm, deeply pinnatifid to within 1 mm of costae, segments 3–5 mm wide. **Aerophores** peglike, 1–3 mm. **Buds** lacking. **Veins** 7–12 pairs per segment. **Indument** on costae and veins abaxially lacking or of very sparse, ascending trichomes 0.1–0.3 mm, laminar tissue glabrous, glands lacking, costal scales lacking or sparse, tan, appressed, non-clathrate, lamina adaxially glabrous or with very sparse trichomes 0.1–0.2 mm on costules and veins. **Sori** supramedial, round, exindusiate, receptacle glabrous, sporangia glabrous.

TYPE—Peru, Ancash, Prov. Bolognesi, cerca a Llamac, *Cerrate 2366* (holotype, GH!; isotype, 2 sheets, USM).

Along streams, 3300–3800 m, Lambayeque and Ancash.

Known only from northern Peru.

The amorphous costal scales and the pro-

nounced peglike aerophores up to 3 mm long at the base of the pinnae indicate that this may be a member of sect. *Blennocaulon*. Important characters distinguishing it from other members of that section include: exindusiate sori; epilose or nearly epilose costae, rachis, and petiole; and eglanular abaxial lamina.

Lambayeque: Prov. Ferrenafe, ca. 4 km NW of Incahuasi, below Cerro Punamachay on trail to Laguna Hualtaco, *Dillon & Skillman 4156* (F, UC).

Comments

Following completion and initial editing of the manuscript, two more new species were discovered, as well as a range extension for a species previously known only from Ecuador. Because it was impractical at that point to revise the key and order of the species, these species are included here as addenda.

Thelypteris arrecta A. R. Sm., *sp. nov.*

Inter species subg. *Amauropeltae* sect. *Phacelothricis*, trichomatibus fasciculatis *T. canadasi* (Sodirol) Alston similis sed differt caule valde erecto foliis distantibus, aerophoris brevioribus ad basin pinnarum, aerophoris ad basin costularum absentibus, venis segmentis minus numerosis trichomatibus minus manifeste fasciculatis ad rhachim et costas abaxialiter, paleis magis numerosis ad costas.

Stem strictly erect, more than 15 cm long, scales brown, dull to somewhat shiny, ovate-lanceolate, with scattered trichomes 0.1–0.25 mm on margins and surface. **Leaves** few, distant, ca. 90 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal ca. 3 pairs of pinnae abruptly reduced, the lowermost pair less than 1 mm long, glanduliform. **Petiolo** ca. 15 cm × 3–4 mm, brownish, with numerous appressed amorphous scales and numerous trichomes in groups of 2–4. **Rachis** with numerous clustered trichomes mostly 0.1–0.2 mm and a few appressed scales. **Pinnae** sessile, to 12 × 1.6 cm, deeply pinnatifid to within 1 mm of costa. **Segments** mostly 2–2.5 mm wide, proximal pairs of lower pinnae not or only slightly reduced. **Aerophores** scalelike or peglike at pinna bases, to 2 mm long. **Buds** lacking. **Veins** up to ca. 12 pairs per segment. **Indument** of costae and costules abaxially of moderately dense, spreading, acicular trichomes mostly 0.1–0.2 mm, these often in pairs or threes, costae also with appressed nonclathrate

scales, lamina adaxially of ascending to appressed trichomes 0.1–0.4 mm on costules, veins, and laminar tissue. **Sori** inframedial to medial, round to slightly oblong, indusia absent or minute, less than 0.1 mm, receptacle or indusial fragment with a few trichomes 0.1 mm, sporangia glabrous.

TYPE—Peru, Cuzco, Paucartambo, carretera Acjancaco–Pilcopata, quebrada a la altura del segundo puente de Pillahuata a La Esperanza, Parque Nacional Manú, *León 2223* (holotype, uc!; isotype, USM).

Montane rain forests, 2650 m, Cuzco.

Known only from the type.

Thelypteris ctenitoides A. R. Sm., *sp. nov.*

A speciebus ceteris subg. *Amauropeltae* differt caule valde erecto apice paleis glabris, segmentis crenulatis, soris submarginalibus, indusiis glabris, 0.5–1 mm in diametro, et praesertim petiolo et rhachide et costis costulisque abaxialiter paleis numerosis ovato-lanceolatis atrobrunneis subclathratis sed trichomatibus fere nullis.

Stem strictly erect, ca. 12 cm long, scales dark brown, subclathrate, somewhat shiny, ovate-lanceolate, lacking trichomes. **Leaves** fasciculate, ca. 50 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal 2–4 pairs of pinnae abruptly reduced, the lowermost pair less than 5 mm long. **Petiole** ca. 8–15 cm × 2–3 mm, stramineous to tan, with numerous appressed ovate-lanceolate scales and sparse trichomes. **Rachis** similar to petiole in indument. **Pinnae** sessile, to 8 × 1.8 cm, deeply incised to within 1 mm of costa. **Segments** mostly 2–3 mm wide, crenulate, proximal pair on lower pinnae not reduced. **Aerophores** peglike at pinna bases, to 5 mm long. **Buds** lacking. **Veins** up to ca. 10 pairs per segment. **Indument** on costae and costules abaxially of numerous, appressed, ovate-lanceolate, subclathrate scales, trichomes lacking or sparse, 0.1–0.2 mm long, lamina adaxially with appressed trichomes 0.1–0.2 mm long, on costules, veins, and a few on laminar tissue. **Sori** submarginal, round, indusia large, 0.5–1 mm in diameter, lacking trichomes, sporangia glabrous.

TYPE—Peru, Amazonas, Prov. Bagua, Cordillera Colán NE of La Peca, *Barbour 3416* (holotype, MO!).

Humid pajonal, 2900–3100 m, Amazonas.

Known only from the type.

The species epithet derives from the strong resemblance of *T. ctenitoides* to some species of *Ctenitis*, many of which have similar scales and often crenulate segments. It is one of the most distinctive species in subg. *Amauropelta*, differing especially by the numerous subclathrate scales covering the axes abaxially. These scales suggest placement in sect. *Lepidoneuron*, but the large indusia cast doubt on this affinity.

Thelypteris exuta A. R. Smith, Fl. Ecuador 18: 45. 1983. **TYPE**: Ecuador, Tungurahua, San Antonio, *Tate 571* (holotype, us!).

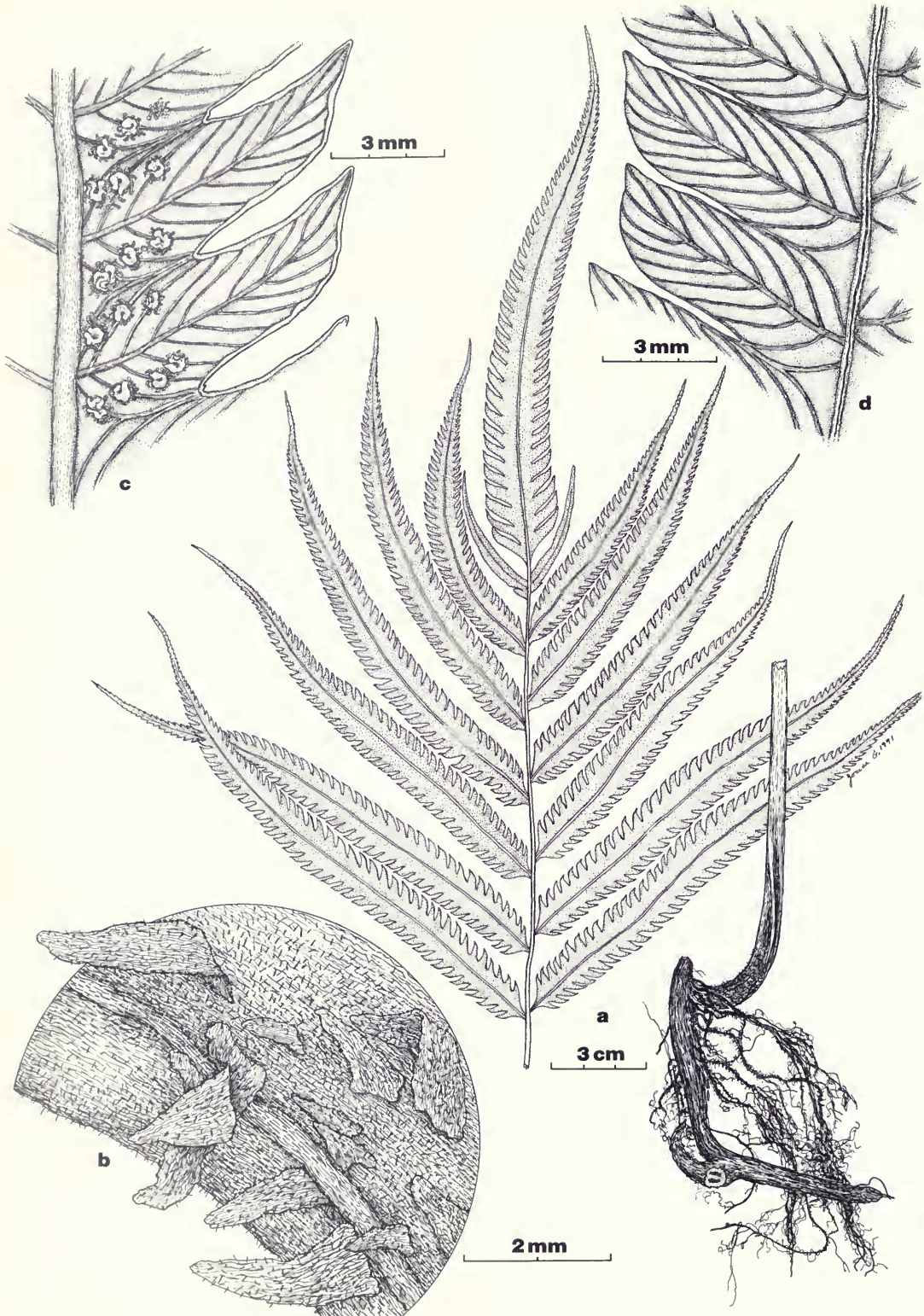
Stem suberect to erect, scales light brown, dull, ovate-lanceolate, glabrous or nearly so. **Leaves** fasciculate, ca. 30–40(–65) cm long. **Lamina** thin-chartaceous, 1-pinnate-pinnatifid, proximal 2–3 pairs of pinnae abruptly reduced, the lowermost pair ca. 1 mm long. **Petiole** 10–20 × 1–1.5(–3) mm, stramineous, with a few scales at base, otherwise glabrous. **Rachis** glabrous. **Pinnae** sessile, opposite or subopposite, 4–6(–10) × 1.2–1.5(–2) cm, deeply incised to ca. 1 mm from costa. **Segments** 2–3(–4) mm wide, proximal pair of pinnae slightly reduced. **Aerophores** absent. **Buds** absent. **Veins** 6–9 pairs per segment. **Indument** lacking abaxially on costae and costules, lamina adaxially glabrous except for trichomes 0.4–0.6 mm along costa and costules. **Sori** medial, round, indusia 0.2–0.3(–0.5) mm in diameter with marginal trichomes 0.2 mm and glands 0.05 mm, sporangia glabrous.

Montane rain forest, 1800 m, San Martín. Ecuador and Peru.

The sole Peruvian collection differs from the Ecuadorian ones in having much more reduced proximal pinnae, setose-margined indusia, and trichomes along the costules adaxially.

San Martín: Prov. Rioja, Pedro Ruiz–Moyobamba road, Km 390, Venceremos, *D. Smith 4426* (MO).

The following collections do not appear to match any known species of subg. *Amauropelta*; they may represent undescribed species or perhaps hybrids. All belong to large and difficult species groups or complexes that are in need of revision before names can be applied with confidence. Additional collections are necessary before adequate descriptions and diagnoses can be written.



C. Schunke 59, 454 (F)—Junín, Chanchamayo Valley, 1000 m. Most similar to *T. opposita* but differing from that in the fewer, more widely spaced reduced proximal pinnae and the presence of flexuous, septate trichomes on the abaxial costae. These differences suggest a relationship to *T. balbisii*, which has generally much wider and longer pinnae.

Ridoutt (GH)—Camino a Pucallpa, Km 209. Most similar to *T. opposita* but differing in the dense, short pubescence and numerous glands on the adaxial lamina, the sparser pubescence on the abaxial costae, the sunken, darkened veins abaxially, and the lack of sessile resinous glands abaxially. In characters of the adaxial lamina, it is very similar to *T. micula*, which is a much smaller, thinner-textured species.

Dudley 11284A (GH)—Cuzco, Prov. La Convención, ca. 17 km NE from Hda. Luisiana and Apurímac River, above Camp 3, 2100 m. This belongs to sect. *Uncinella*, as indicated by the abundant hamate trichomes on the costae and lamina abaxially and the dense appressed, short trichomes on the adaxial lamina. Peglike aerophores are present at the pinna bases, and there are persistent scales along the rachis and costae abaxially. A description of this probable new species must await the discovery of fertile material.

IIC. *Thelypteris* subg. *Cyclosorus*.

Thelypteris subg. *Cyclosorus* (Link) Morton, Amer. Fern J. 53: 153. 1963. **Figure 4.**

Cyclosorus Link, Hort. Reg. Bot. Berol. 2: 128. 1833.

TYPE: *Cyclosorus gongyloides* (Schkuhr) Link = *Thelypteris interrupta* (Willd.) Iwatsuki.

Christella Lévillé, Fl. Kouy-tchéou 472. 1915. TYPE: *Christella parasitica* (L.) Lévillé = *Thelypteris parasitica* (L.) Tard.

Amphineuron Holttum, Blumea 19: 45. 1971. TYPE: *Amphineuron opulentum* (Kaulf.) Holttum = *Thelypteris opulenta* (Kaulf.) Fosberg.

Lamina 1-pinnate-pinnatifid, pinnae pinnatifid half their width or more; proximal pinnae not reduced or up to ca. 6 pairs gradually reduced in a few spp., distal pinnae gradually shortened and lamina with a confluent pinnatifid apex or abruptly

ly shortened and with a subconform terminal pinna; aerophores and buds lacking. **Veins** simple, those from adjacent segments meeting margin at or near the sinus, or connivent at or just below sinus, or one pair united at an obtuse angle below sinus with an excurrent vein to sinus. **Indument** of acicular, nonseptate trichomes. **Sori** round, with a persistent round-reniform indusium at least 0.5 mm in diameter; sporangia glabrous or with a stipitate gland on the stalk. **Spores** with a few prominent connected winglike ridges, or many disconnected ones, or somewhat echinate. $x = 36$.

As circumscribed here, this includes *Amphineuron* (Holttum, 1977) and *Christella* (Holttum, 1976), two predominantly Old World groups. The type of *Cyclosorus*, which is a synonym of *T. interrupta*, belongs to a small group of marsh-inhabiting species not closely related to the rest of the subgenus in Peru.

Subgenus *Cyclosorus* comprises about 20 New World species and a much larger number of Old World ones. In general, species of *Cyclosorus* are common and even weedy along roadsides and ditches. One introduced species, *T. dentata*, is widely naturalized in the Neotropics but is so far rarely collected in Peru. A second naturalized species, *T. opulenta*, has become one of the most abundant ferns around Iquitos.

Those species with reduced proximal pinnae, namely *T. dentata*, *T. hispidula*, and *T. conspersa*, can be distinguished from subg. *Amauropelta* by veins that unite below the sinus or are connivent at the sinus.

References

- HOLTTUM, R. E. 1976. Studies in the family Thelypteridaceae XI. The genus *Christella* Lévillé, sect. *Christella*. Kew Bull. 31: 293–339.
- HOLTTUM, R. E. 1977. Studies in the family Thelypteridaceae XII. The genus *Amphineuron* Holttum. Blumea 23: 205–218.
- SMITH, A. R. 1971. Systematics of the neotropical species of *Thelypteris* section *Cyclosorus*. Univ. Calif. Publ. Bot. 59: 1–143.

FIG. 4. Subgenus *Cyclosorus*. *Thelypteris depilata*: a, stem and portion of petiole, apical portion of lamina; b, portion of petiole base; c, costa and pinna segments, abaxial side; d, costa and pinna segments, adaxial side. (From Saunders 570, holotype, F.)

Key to Species of subg. *Cyclosorus*

- a. Basal veins from adjacent segments united at an obtuse angle below sinus with an excurrent vein to sinus; costules, veins, and often lamina adaxially pubescent b
- b. Proximal pinnae the longest or nearly so; costae abaxially with ovate scales; lamina abaxially with sessile orange or reddish, hemispherical glands 48. *T. interrupta*
- b. Proximal pinnae reduced; costae abaxially scaleless; lamina abaxially lacking glands or the glands short-stipitate, light yellow c
- c. Costae abaxially with most trichomes more than 0.3 mm long with some exceeding 0.5 mm; petiole and rachis stramineous to tan 49. *T. hispidula*
- c. Costae abaxially with predominantly short trichomes uniform in length, mostly 0.1–0.2 mm long; petiole and rachis usually purplish brown 50. *T. dentata*
- a. Basal veins from adjacent segments connivent at, or running to, sinus; costules, veins, and lamina adaxially glabrous or pubescent d
- d. Rhizome suberect to erect, hidden by old leaf bases; proximal pinnae often auriculate at base ... 53. *T. patens*
- d. Rhizome creeping, readily visible; proximal pinnae not auriculate 3
- e. Several pairs of proximal pinnae greatly reduced; lamina adaxially with numerous trichomes between veins 51. *T. conspersa*
- e. Proximal pinnae not reduced; lamina adaxially glabrous between veins f
- f. Glands sulfur-yellow, sessile, present abaxially along veins and costules, especially toward segment tips, and among sporangia; costae abaxially scaleless 52. *T. opulenta*
- f. Glands absent along veins and costules abaxially and among sporangia; costae abaxially with or without scales g
- g. Costae abaxially without trichomes 54. *T. depilata*
- g. Costae abaxially sparsely to densely pubescent h
- h. Costal trichomes mostly greater than 0.2 mm, dense; costal scales numerous 55. *T. clivalis*
- h. Costal trichomes ca. 0.1 mm, moderately dense; costal scales relatively few 56. *T. grandis*

48. *Thelypteris interrupta* (Willd.) Iwatsuki, Jap. J. Bot. 38: 314. 1963.

- Pteris interrupta* Willd., Phytogr. 13, pl. 10, fig. 1. 1794. TYPE: Southern India, Klein (holotype, B, Herb. Willd. 19770; microfiche, UC).
- Polypodium tottum* Thunb., Prodr. pl. cap. 172. 1800. TYPE: South Africa, Thunberg Herb. 24724 (holotype, UPS!).
- Aspidium gongyloides* Schkuhr, 24. Kl. Linn. Pfl.-Syst. [Krypt. Gew.] 1: 193, pl. 33c. 1804. TYPE: British Guiana, Essequibo, collector unknown (holotype, HAL?; isotype, S).
- Cyclosorus gongyloides* (Schkuhr) Kuntze, Revis. gen. pl. 2: 811. 1891.
- Thelypteris gongyloides* (Schkuhr) Small, Ferns s.e. States 248. 1938.
- Thelypteris totta* (Thunb.) Schelpe, J. S. African Bot. 29: 91. 1963.

Stem long-creeping, to 2 m or more, dark brown to blackish, nearly devoid of scales. **Leaves** few, 1–5(–9) cm distant, mostly 50–100(–180) cm long.

Lamina chartaceous to subcoriaceous, 1-pinnate-pinnatifid, proximal pinnae the longest or nearly so. **Petiole** to 50(–100) cm × 3–4(–6) mm, tan to stramineous and lacking scales above the base. **Rachis** glabrescent or with scattered trichomes mostly 0.2–0.3 mm abaxially. **Pinnae** sessile or short-stalked, 7–15(–30) × 0.8–1.3(–2.2) cm, shallowly pinnatifid to ca. 2–4 mm from costae, not auriculate at base, segments 2.5–4 mm wide. **Aerophores** absent. **Buds** lacking. **Veins** 8–12(–18) pairs per segment, lowermost pair from adjacent segments connivent or obtusely uniting below sinus. **Indument** on costae, veins, and laminar tissue abaxially of very sparse to dense, spreading, acicular or crispate trichomes mostly 0.1–0.3 mm, also with sessile orange or red shiny globular glands 0.1 mm on costules, veins, and laminar tissue, costal scales tan, ovate, to 2 mm, adaxially the lamina glabrous or nearly so. **Sori** medial, round, indusia glabrous or usually with trichomes and

sessile glands, sporangial stalks often with stalked glands.

Along streams and edges of lakes, marshes, on floating islands, 100–260 m, Loreto and Madre de Dios.

Florida; Antilles; Mexico to Panama; Colombia to Guianas and northern Argentina; Paraguay; tropical and subtropical Africa, Asia.

Loreto: Prov. Maynas, 4 km S of Iquitos, *Tryon & Tryon 5211* (F, GH, US). **Madre de Dios:** Prov. Tambopata, ca. 30 air km SSW of Puerto Maldonado at effluence of Río La Torre (Río D'Orbigny)/Tambopata, *Barbour 4908* (MO, UC, USM), *Young 33* (MO, UC, USM). Cocha Cashu, Río Manú, between Panagua and Tayakome, *R. Foster et al. 3374* (F), *3375* (GH, USM). Laguna Coco Cocha, 5.2 km E of lodge, *Funk et al. 8399* (F, USM).

49. *Thelypteris hispidula* (Decne.) Reed, *Phytologia* 17: 283. 1968.

Aspidium hispidulum Decne., *Nouv. Ann. Mus. Hist. Nat.* 3: 346. 1834. TYPE: Timor, *Guichenot* (holotype, P).

Nephrodium quadrangulare Fée, (*Mém. foug.* 5) Gen. fil. 308. 1852. TYPE: French Guiana, *Leprieur 182* (isotypes, NY!, P).

Dryopteris parasitica (L.) var. *glanduligera* Rosenst., *Repert. Spec. Nov. Regni Veg.* 7: 304. 1909. TYPE: Peru, (San Martín), Tarapoto, *Spruce 4039* (holotype, P!; isotypes, BM!, P!).

Dryopteris quadrangularis (Fée) Alston, *J. Bot.* 75: 253. 1937.

Thelypteris quadrangularis (Fée) Schelpe, *J. S. African Bot.* 30: 196. 1964.

Christella hispidula (Decne.) Holttum, *Kew Bull.* 31: 312. 1976.

Stem short-creeping to ascending or erect, scales brown, shining, linear-lanceolate, setose on margins and surfaces. **Leaves** several, fasciculate, mostly 50–100 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal 1–4 pairs of pinnae slightly to greatly reduced, the lowermost to 2 cm or less. **Petiole** 10–40 cm × 2–5 mm, tan to stramineous and lacking scales above the base. **Rachis** pubescent abaxially, trichomes 0.4–1 mm. **Pinnae** sessile, 5–15 × 1–2(–2.5) cm, deeply pinnatifid 1.5–3 mm from costae, proximal ones often auriculate at acroscopic base, segments 2–4 mm wide. **Aerophores** absent. **Buds** lacking. **Veins** 6–9(–11) pairs per segment, lowermost pair from adjacent segments united below sinus with an excurrent veinlet 1–2 mm to sinus. **Indument** on costae, veins, and laminar tissue abaxially of moderately dense to dense, spreading, acicular trichomes 0.3–1 mm,

often also with sessile to short-stipitate, light yellowish glands, costal scales lacking, adaxially with numerous acicular trichomes 0.3–1 mm and often glands on costules, veins, and laminar tissue. **Sori** medial, round, indusia pubescent, sporangial stalks obscurely stipitate-glandular.

Lowland and montane rain forests, pastures, along trails and edges of woods, 100–1500 m, Lambayeque and Amazonas, south to Cuzco and Madre de Dios.

Southeastern United States; Antilles; Mexico to Panama; Colombia to Guianas and Bolivia; northern Argentina; tropical and subtropical Africa and Asia.

All Peruvian material seen is referable to what I previously called *T. quadrangularis* var. *quadrangularis* (Smith, 1971). However, the relationship between var. *quadrangularis* in the New World and *T. hispidula* in the Old World is unstudied, and I prefer not to make a varietal combination at this time. *Thelypteris hispidula* var. *inconstans* (C. Chr.) Proctor (Antilles) and var. *versicolor* (R. St. John) Lellinger (southeastern United States) are sufficiently distinct to be recognized. The status of *Thelypteris quadrangularis* var. *repens* A. R. Sm. (southern Brazil, Uruguay, northeastern Argentina) is also problematic vis-à-vis Paleotropical specimens.

Lambayeque: Entre Beatita de Humay y Km 38, carretera Olmes-Marañón, *López et al. 4044* (GH). **Amazonas:** Prov. Bagua, Chomza and environs, ca. 5 km S of La Peca, *Barbour 4313* (MO, USM). **San Martín:** Prov. San Martín, Tarapoto, San Antonio de Cumbaza, *Sagástegu 0219* (GH). San Roque, *Ll. Williams 7079* (F, US). **Loreto:** Gamitanacocha, Río Mazán, *Schunke 203* (F, GH, UC, US). Mishuyacu, near Iquitos, *Klug 1335* (F, NY, US). Prov. Maynas, Río Itaya, 10 km S of Iquitos, *Tryon & Tryon 5207* (F, GH, U, USM). **Huánuco:** Hacienda at mouth of Río Chinchao, *Macbride 5028* (F, US). **Pasco:** Río Paucartambo valley, near Perené bridge, *Killip & Smith 25308* (NY, US). Quillasú, *Soukup 3295* (GH). **Junín:** La Merced-Chanchamayo, *Soukup 1029* (F). **Ayacucho:** Estrella, between Huanta and Río Apurímac, *Killip & Smith 22621* (F, GH, NY, US). **Cuzco:** Pilcopata, Atalaya, Paucartambo, *Núñez 6857* (MO). **Madre de Dios:** Prov. Manú, Piñipiñi Defensa, *Vargas 11611* (GH), *11612* (GH).

50. *Thelypteris dentata* (Forssk.) E. St. John, *Amer. Fern J.* 26: 44. 1936.

Polypodium dentatum Forssk., *Fl. Aegypt.-arab.* 185. 1775. TYPE: southwestern Arabia, Yemen, *Forsskål* (holotype, C!).

Polypodium molle Jacq., *Collectanea* 3: 188. 1789, not

Schreb., 1771, not All., 1785. TYPE: cultivated specimen from gardens at Schoenbrunn (holotype, w!).

Dryopteris mollis (Sw.) Hieron., Hedwigia 46: 348. 1907.

Dryopteris dentata (Forssk.) C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 8, 6: 24. 1920.

Cyclosorus dentatus (Forssk.) Ching, Bull. Fan Mem. Inst. Biol., Bot. 8: 206. 1938.

Christella dentata (Forssk.) Brownsey & Jermy, Brit. Fern Gaz. 10: 338. 1973.

Stem short-creeping, scales brown, shining, linear-lanceolate, setose on margins and surfaces. **Leaves** several, slightly dimorphic with the fertile having longer petioles and narrowed pinnae, mostly 50–100(–135) cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal 2–6 pairs of pinnae slightly to often greatly reduced, the lowermost often less than 2 cm. **Petiole** 15–45 cm × 2–5 mm, tan to purplish brown and lacking scales above the base. **Rachis** pubescent abaxially, trichomes mostly 0.2–0.4 mm. **Pinnae** sessile, 7–15 × 1–2.5 cm, deeply pinnatifid 2–4 mm from costae, proximal ones often auriculate at acroscopic base, segments 2–4 mm wide. **Aerophores** absent. **Buds** lacking. **Veins** 6–11 pairs per segment, basal pair from adjacent segments united below sinus with an excurrent veinlet 2–3 mm to sinus. **Indument** on costae, veins, and laminar tissue abaxially of moderately dense to dense, uniform, spreading, acicular trichomes 0.1–0.2 mm, glands and costal scales lacking, adaxially with numerous acicular trichomes 0.1–0.3 mm on costules, veins, and laminar tissue. **Sori** medial, round, indusia pubescent, sporangial stalks obscurely stipitate-glandular.

Lowland forests, especially along trails, in ditches, pastures, 200–600 m, Loreto and Madre de Dios.

Southeastern United States; Antilles; southern Mexico to Panama; Colombia to Venezuela and Bolivia; Brazil; Argentina; tropical and subtropical Africa, Asia, islands of the Pacific.

This is introduced and widely naturalized in the New World (Strother & Smith, 1970, Taxon 19: 871–874) but has not reached Andean countries until recently. It appears still to be uncommon in Peru but is likely to spread rapidly in the future. *Thelypteris dentata* can be easily confused with *T. hispidula*, with which it has sometimes been combined.

Loreto: Prov. Iquitos, Procedencia Andoas, 23 Oct 1979, Ayala 2124 (UC). Prov. Alto Amazonas, carretera Oleoducto secundario entre Andoas y Capahuari Sur, 13

Sep 1979, Diaz & Jaramillo 1364 (MO). **Madre de Dios**: Prov. Manú, Río Salvación, 6 Dec 1986, Núñez 6588 (MO).

51. **Thelypteris conspersa** (Schrader) A. R. Sm., Univ. Calif. Publ. Bot. 59: 60. 1971.

Nephrodium conspersum Schrader, Gött. gel. Anz. 1824: 869. LECTOTYPE (chosen by Smith, 1971, p. 60): Brazil, near Espirito Santo, Barra de Fucú, Wied-Neuwied (BR!; photo, UC; isolotypes, BR!, L).

Dryopteris bangii C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 4: 333. 1907. TYPE: Bolivia, Yungas, near Coroica, Bang 2321 (holotype, C; isotypes, B!, GH!, LD!, US!).

Stem short-creeping, scales brown, shining, linear-lanceolate, setose on margins and surfaces. **Leaves** several, mostly 75–150 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal 3–6 pairs of pinnae gradually reduced, the lowermost to 3 cm or less. **Petiole** 30–60 cm × 3–6 mm, stramineous and lacking scales above the base. **Rachis** densely pubescent abaxially, trichomes 0.5–1.2 mm. **Pinnae** sessile, (7–)10–20 × 1.5–2.2 cm, deeply pinnatifid 1–3 mm from costae, proximal ones often auriculate at acroscopic base, segments 2–4 mm wide. **Aerophores** absent. **Buds** lacking. **Veins** 8–12 pairs per segment, lowermost pair from adjacent segments running to sinus or connivent just below sinus, occasionally united below sinus with an excurrent vein up to ca. 1 mm. **Indument** on costae, veins, and laminar tissue abaxially of usually dense, spreading, acicular trichomes mostly 0.5–1 mm, sometimes also with short-stipitate, light yellowish glands, less often the glands more numerous than trichomes, costal scales lacking, adaxially with numerous acicular trichomes to 1 mm on costules, veins, and laminar tissue, these sometimes replaced by glands. **Sori** medial, round, indusia densely pubescent, sporangial stalks obscurely stipitate-glandular.

Montane forests, meadows, 700–1300 m, San Martín, Junín, and Cuzco.

Hispaniola; Panama; Venezuela, Colombia; Peru; Bolivia; southern Brazil; northern Argentina; Paraguay; Uruguay.

Two collections, *Coronado 260* and *Soukup 1159*, differ in being only sparsely pubescent but with numerous short-stipitate glands.

San Martín: Hera near Moyobamba, Woytkowski 35312 [U.C. Bot. Gard. acc. 55.080] (GH, UC). Junín:

Near San Ramón, *Coronado 260* (GH). **Cuzco:** Prov. La Convención, Ichiquiato, *Vargas 22332* (GH). Potrero, 8 km W of Quillabamba, *Tryon & Tryon 5391* (F, GH, U). Empalzaota, *Bües 1719* (GH). **Department Unknown:** *Soukup 1159* (F).

52. *Thelypteris opulenta* (Kaulf.) Fosberg, Smithsonian Contr. Bot. 8: 3. 1972.

Aspidium opulentum Kaulf., Enum. fil. 238. 1824.

TYPE: Guam, *Chamisso* (holotype, LE).

Aspidium extensum Blume, Enum. pl. jav. 156. 1828.

TYPE: Java, Pulu Pinang, collector not stated (holotype, L; photo, UC).

Dryopteris extensa (Blume) Kuntze, Rev. gen. pl. 2: 812. 1891.

Thelypteris extensa (Blume) Morton, Amer. Fern J. 49: 113. 1959.

Amphineuron opulentum (Kaulf.) Holtt., Blumea 19: 45. 1971.

Stem long- to short-creeping, scales brown, shining, linear-lanceolate, setose on margins and surfaces. **Leaves** few, mostly 90–200 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal pinnae not reduced or with 1 pair greatly reduced, lamina apex somewhat prolonged. **Petiole** 40–100 cm × 3–6 mm, tan to stramineous and lacking scales above the base. **Rachis** sparsely pubescent and stipitate-glandular abaxially, trichomes and glands 0.1 mm or less. **Pinnae** sessile or short-stalked to 2 mm, 15–30(–40) × 1.3–3 (–3.5) cm, deeply pinnatifid 2–4 mm from costae, proximal ones not auriculate at base, segments 2–4 mm wide. **Aerophores** absent. **Buds** lacking. **Veins** 8–14 pairs per segment, lowermost pair from adjacent segments united below sinus with an excurrent veinlet to ca. 1 mm or veins connivent near sinus. **Indument** on costae, veins, and sometimes laminar tissue abaxially of sparse to moderately dense, spreading, acicular trichomes less than 0.1 mm and often a few longer trichomes to 0.5 mm on axes, also with numerous sulfur-yellow, sessile glands especially along costules and veins, often also of short-stipitate, light yellowish glands, costal scales lacking, adaxially with scattered acicular trichomes to ca. 0.5 mm on costules and veins. **Sori** supramedial, round, often confined to pinna lobes, indusia with marginal glands and sometimes a few acicular trichomes, sporangial stalks obscurely glandular.

Lowland rain forests, secondary forests, old plantations, along trails, and in partially disturbed areas, 100–650 m, Amazonas, Loreto, San Martín,

Huánuco, Pasco, Ucayali, Cuzco, and Madre de Dios.

Jamaica; Lesser Antilles; Costa Rica and Panama; Colombia to Guianas and Peru; native to Africa and Asia.

This has become an extremely common naturalized fern in parts of Peru, and I have seen 45 collections, 28 of them from Loreto. Only one of the collections was made prior to 1964, that in 1956.

Amazonas: Prov. Bagua, ca. 40–43 km NE of Chiriaco, *Barbour 4529* (MO, USM). **San Martín:** San Martín, 7–15 km E of Shapojo on road to Chazuta, *Knapp et al. 7264* (F, MO). **Loreto:** Quebrada Shanuce above Yurimaguas, *Croat 18050* (F, MO, UC, USM). 13 km SW of Iquitos, *Croat 18595* (F, MO, UC). Río Itaya, 10 km S of Iquitos, 13 Aug 1956, *Tryon & Tryon 5202* (F, GH, U). **Huánuco:** Road from Tingo María to “Monson” (Monzón), *Croat 57921* (MO, UC). **Pasco:** Prov. Oxapampa, Quebrada Castilla near Villa América, on Omaiz River, *León & Young 1021a* (UC, USM). **Ucayali:** Arboretum of Bosque von Humboldt Experimental Station, Km 86 on Pucallpa–Tingo María road, *D. Smith 1223* (MO, UC). **Cuzco:** Prov. Quispicanchi, Inambari, *Vargas 15362* (GH). **Madre de Dios:** Prov. Tambopata, ca. 30 air km SSW of Puerto Maldonado, *Barbour 4962* (F, MO, UC). Prov. Manú, Manú Park, Cocha Cashu uplands, *Núñez 5859* (MO).

53. *Thelypteris patens* (Sw.) Small, Ferns s.e. States 243. 1938.

Stem suberect to usually erect, scales tan to brown, dull to shining, lanceolate to ovate-lanceolate, glabrous or setose on margins and surfaces. **Leaves** several, fasciculate, mostly 45–150 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal pinnae the longest or nearly so, or with one pair slightly to rarely greatly reduced. **Petiole** 15–60 cm × 3–6 mm, tan to stramineous and lacking scales above the base. **Rachis** pubescent abaxially, trichomes 0.4–1 mm. **Pinnae** sessile, 10–30 × (1–)1.5–3 cm, deeply pinnatifid 1–2 mm from costae, proximal ones often auriculate at acroscopic base or elongate parallel to rachis, segments 2–4 mm wide. **Aerophores** absent. **Buds** lacking. **Veins** 8–15(–21) pairs per segment, lowermost pair from adjacent segments running to sinus or distal vein of a pair meeting margin just above sinus, infrequently lowermost pair connivent just below sinus. **Indument** on costae, veins, and laminar tissue abaxially of moderately dense to dense, spreading, acicular trichomes 0.2–0.8 mm, often also of sessile to short-stipitate, light yellowish glands, costal scales lacking, lamina adaxially glabrous except along costae or with acic-

ular trichomes 0.3–0.5 mm on costules and sometimes veins. *Sori* medial, round, indusia usually densely pubescent, trichomes 0.2–0.5 mm long, sporangial stalks obscurely stipitate-glandular or lacking glands.

The two varieties encountered in Peru are generally readily distinguishable and could perhaps stand as species. A third entity, var. *dissimilis* (Schrad.) A. R. Sm., is restricted to southern Brazil, Paraguay, and northeastern Argentina.

Key to Varieties

- a. Lamina adaxially glabrous on costules and veins; petiole base scales tan, ovate to ovate-lanceolate, glabrous or nearly so, dull 53a. var. **patens**
 a. Lamina adaxially with trichomes on costules and veins; petiole base scales brown, lanceolate, pubescent, shining 53b. var. **smithiana**

53a. *Thelypteris patens* var. *patens*.

Polypodium patens Sw., Prodr. 133. 1788. LECTOTYPE (chosen by Smith, Univ. Calif. Publ. Bot. 59: 72. 1971): Jamaica, Swartz (s!; photo, UC).

Aspidium stipulare Willd., Sp. pl. ed. 4, 5: 239. 1810. TYPE: Plumier, t. 23.

Aspidium macrourum Kaulf., Flora 6: 365. 1823. TYPE: Martinique, Sieber 354 (isotypes, L, M!, MO!).

Lastrea scabriuscula Presl, Epim. bot. 35. 1849, not Davenp., 1896. LECTOTYPE (chosen by Christensen, 1913): Brazil, ad Rio de Janeiro, Mikan (PRC).

Dryopteris patens (Sw.) Kuntze, Rev. gen. pl. 2: 813. 1891.

Thelypteris patens var. *scabriuscula* (Presl) A. R. Sm., Univ. Calif. Publ. Bot. 59: 76. 1971.

Lowland and montane forests, roadsides, wet ditches, 200–1900 m, Piura, Lambayeque, Cajamarca, San Martín, Loreto, Huánuco, Lima, Pasco, Junín, Cuzco, and Puno.

Florida; Antilles; Mexico to Panama; Colombia and Venezuela to southern Brazil and Bolivia.

Piura: Hills of Chiarnique ca. 20 km ENE of Naupe, *Barbour 2161* (F, MO, UC, USM). **Lambayeque:** Prov. Lambayeque, Quebrada Onda, *Llatas Quiroz 1124* (F). **Cajamarca:** Prov. Cajamarca, ca. 9 km W of San Juan and 46 km SW of Cajamarca on road to San Pedro de Lloc, *Dillon & Whalen 4069A* (F, GH, UC, USM). **San Martín:** Prov. San Martín, Tarapoto, *Woytkowski 35075* (MO, UC). **Loreto:** Lower Río Huallaga, *Ll. Williams 5108* (F). **Huánuco:** Prov. Leoncio Prado, along road to Monzón above Río Huallaga across bridge from Tingo María, *Croat 50973* (MO). **Lima:** Chosica, *Bryan 22* (F). **Pasco:** Pozuzo, *Macbride 4601* (F, NY, US). **Junín:** Prov. Tarma, cerca a la Merced, *Cerrate 2855* (GH). **Cuzco:** Prov. La Convención, Pawac Portage, one hour float below Pomobamba, *Davis et al. 1264* (GH). **Puno:** Prov. Sandia, Yanamayo, *Soukup & López* [USM 14656] (GH).

53b. *Thelypteris patens* var. *smithiana* Ponce, Darwiniana 28: 373. 1987. TYPE: Argentina, Prov. Salta, Dpto. Orán, Zanja Honda–Quebrada Sierra de Aguarague, *Abbiatti & Claps 273* (holotype, LP).

Nephrodium schizotis Hooker, Sp. fil. 4: 107. 1862. TYPE: Peru, (San Martín), near Tarapoto, *Spruce 4030* (holotype, K!; isotype, BM!). Another sheet of this number at GH is *T. patens* var. *patens*.

Lowland and montane forests, roadsides, ditches, seepage areas, along trails, 400–2200 m, Lambayeque, Cajamarca, Amazonas, San Martín, Loreto, Huánuco, Lima, Junín, Ayacucho, Cuzco, and Puno.

Antilles; Costa Rica to Panama; Colombia to Venezuela and northwestern Argentina.

This taxon was formerly called *T. patens* var. *scabriuscula* (Presl) A. R. Sm., but Ponce has examined the type of that variety and found it to be referable to var. *patens*.

Lambayeque: 20 km from Olmos on road to Jaén, *Correll & Smith P793* (GH). **Cajamarca:** Ciudad Jaén, *Cerrón* [*Coronado 43*] (GH, UC, US). **Prov. Santa Cruz,** Dist. Catache, upper Río Zaña valley ca. 1 km above Monte Seco on road to El Chorro, *Dillon et al. 4328* (F, GH, UC). **Amazonas:** Prov. Bagua, along roadside between La Peca and Bagua Chica, *Barbour 4282* (MO, USM). **San Martín:** Río Huallaga Cañon, below Río Santo Domingo, *Macbride 4260* (F, US). **Loreto:** Pumayacu, between Balsapuerto and Moyobamba, *Klug 3231A* (US). **Huánuco:** Cueva Grande Estacion near Pozuzo, *Macbride 4787* (F). **Prov. Huánuco,** road Huánuco to Muña, Chulque, *Mexia 4099* (GH, MO, UC). **Lima:** Prov. Lima, near Río Santa Eulalia, Chosica, 40 km E of Lima, *Tryon & Tryon 5341.5* (GH). **Junín:** Prov. Tarma, cerca a la Merced, *Cerrate 2840* (GH, USM). **La Merced,** *Killip & Smith 23476* (NY, US), *Kunkel 609* (F, GH). **Ayacucho:** Estrella, between

Huanta and Río Apurímac, *Killip & Smith 22650* (GH, NY, US). **Cuzco:** La Convención, Río Apurímac, between San Martín and Hda. Luisiana, *Davis et al. 1328* (F, GH). **Puno:** Prov. Sandía, between Río Azata and Colorado, *Núñez & Muñoz 5244* (MO).

54. *Thelypteris depilata* A. R. Sm., *sp. nov.* **Figure 4.**

A speciebus ceteris subg. *Cyclosori* distinguenda axis et lamina omnino glabris, pinnis proximalibus ad basin angustatis non auriculatis, 2–3 infimis paribus venarum ex segmentis contiguis ad sinum conniventibus, costarum paleis paucis vel nullis.

Stem long-creeping, scales brown, shining, lanceolate, setose on margins and surfaces. **Leaves** few, distant, 80–120 cm long. **Lamina** thick-chartaceous, 1-pinnate-pinnatifid, proximal pinnae not or only slightly reduced. **Petiole** 30–60 cm × 4–8 mm, tan to stramineous and lacking scales above the base. **Rachis** glabrous abaxially. **Pinnae** sessile, 16–22 × 1.5–2.2 cm, deeply pinnatifid 2–3 mm from costae, those in lower half of lamina narrowed at the base, not auriculate, segments 3 mm wide. **Aerophores** absent. **Buds** lacking. **Veins** 13–17 pairs per segment, lowermost 2–3 pairs from adjacent segments connivent at sinus. **Indument** on costae, veins, and laminar tissue abaxially lacking, costal scales lacking or very sparse, adaxially the lamina glabrous even on costae. **Sori** medial, round, indusia glabrous, sporangial stalks without glands.

TYPE—Peru, Dpto. Pasco, Prov. Oxapampa, ca. 20 km from Oxapampa towards La Merced, 3400 ft, *Saunders 570* (holotype, F!; isotype, UC!).

Along streams, 1000–2150 m, Huánuco and Pasco.

Known only from Peru.

This differs from other Peruvian *Thelypteris* subg. *Cyclosorus* by the completely glabrous lamina. In other characters, it is most similar to *T. clivalis*, which is densely pubescent and has numerous costal scales.

Huánuco: Muña, *Macbride 3991* (F, 2 sheets).

55. *Thelypteris clivalis* A. R. Sm., *nom. nov.*

Dryopteris oligophylla var. *aequatorialis* C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 10: 189. 1913. **LECTOTYPE** (chosen

by Morton, 1967): Ecuador, Baños, Río Pastaza, *Spruce 5296* (P; isolectotypes, K!, NY!). *Thelypteris grandis* var. *aequatorialis* (C. Chr.) A. R. Sm., Univ. Calif. Publ. Bot. 59: 98. 1971.

Stem long-creeping, scales brown, dull to shining, lanceolate, setose on margins and surfaces. **Leaves** few, distant, mostly 100–200 cm long. **Lamina** thick-chartaceous to subcoriaceous, 1-pinnate-pinnatifid, proximal pinnae not or only slightly reduced. **Petiole** 50–100 cm × 5–10 cm, tan to stramineous and lacking scales above the base. **Rachis** densely pubescent abaxially, trichomes 0.2–0.5 mm, also usually with a few scales. **Pinnae** sessile or short-stalked less than 1 mm, 16–25 × 2–3 cm, deeply pinnatifid 2–3 mm from costae, proximal ones narrowed at the base, not auriculate, segments 3–4 mm wide, basisopic ones of proximal pinnae greatly reduced or sometimes wanting. **Aerophores** absent. **Buds** lacking. **Veins** 14–21 pairs per segment, lowermost 1–2 (–3) pairs from adjacent segments connivent at the sinus. **Indument** on costae, veins, and often laminar tissue abaxially of usually dense, spreading, crispate and acicular trichomes 0.2–0.5 mm, glands lacking, costal scales numerous, castaneous, shining, 0.7–2 mm long, densely setulose, adaxially the lamina glabrescent or with scattered crispate trichomes 0.2–0.4 mm on and sometimes between veins. **Sori** medial, round, indusia densely pubescent, sporangial stalks without glands.

Along roads and trails, montane forests, (1000–) 1600–2500 m, Cajamarca, San Martín, Pasco, Junín, and Cuzco.

Colombia to Bolivia.

The varietal epithet *aequatorialis* cannot be transferred to *Thelypteris* at species rank because of the earlier *T. aequatorialis* (Copel.) Reed.

This species is most closely related to *T. grandis* and differs primarily by the denser and longer trichomes on the costae abaxially, more numerous costal scales, generally narrower pinnae, more falcate segments, and smaller fronds. It grows at higher elevation than *T. grandis* var. *kunzeana*. The decision to recognize it at species rather than varietal rank is the result of recognition of its elevational separation and the fact that there seem to be no intermediates between it and varieties of *T. grandis*.

Cajamarca: Prov. Celendín, Llangat, *Mostacero 0955* (F, MO). **San Martín:** Prov. Rioja, Km 385–390 on Moyobamba–Bagua road, Venceremos to Campamento Gar-

cia, *D. Smith* 5977 (F, USM). **Huánuco:** Between Huánuco and Pampayacu, *Kanehira* 167 (US). Prov. Huánuco, road Huánuco to Muña, Chulque, *Mexia* 4101 (GH, UC). **Pasco:** Quillasú, *Soukup* 3288 (GH, US). **Junin:** Between Tarma and San Ramón, vicinity of Huacapistana, *Croat* 57649 (F, MO, USM). Prov. Tarma, valle del Río Chanchamayo, *Esposito* 655 (GH, USM). Carpapata, *Kunkel* 631 (GH). Yucapata, *Woytkowski* 6748 (MO, TENN, US). **Ayacucho:** Ayna, between Huanta and Río Apurímac, *Killip & Smith* 22553 (NY). **Cuzco:** Prov. Urubamba, Machu Picchu, *Vargas* 17448 (GH).

56. ***Thelypteris grandis*** A. R. Sm., Univ. Calif. Publ. Bot. 59: 96. 1971, var. ***kunzeana*** (Hooker) A. R. Sm., Univ. Calif. Publ. Bot. 59: 99. 1971.

Aspidium abruptum Kunze, Linnaea 9: 93. 1834, not Blume, 1828. TYPE: Peru, (Huánuco), Pampayacu, *Poeppig* (holotype, LZ, destroyed; probable isotypes, b!, k!, p!).

Nephrodium kunzeanum Hooker, Sp. fil. 4: 102. 1862. *Nom. nov.* for *Aspidium abruptum* Kunze, not Blume.

Dryopteris oligophylla var. *kunzeana* (Hooker) C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 10: 189. 1913.

Thelypteris invisula var. *kunzeana* (Hooker) Morton, Contr. U.S. Natl. Herb. 38: 62. 1967.

Stem long-creeping, scales brown, dull, linear-lanceolate, setose on margins and surfaces. **Leaves** few, distant, mostly (100–)150–250 cm long. **Lamina** thick-chartaceous to subcoriaceous, 1-pinnate-pinnatifid, proximal pinnae not or only slightly reduced, apex subabruptly reduced. **Petiole** 50–100 cm × 5–10 mm, tan to stramineous and lacking scales above the base. **Rachis** moderately to densely pubescent abaxially, trichomes 0.1–0.2 mm. **Pinnae** sessile or the proximal short- to long-stalked up to 20 mm, 20–30 × 2–4.5 cm, deeply pinnatifid 3–6 mm from costae, proximal ones narrowed at the base, not auriculate, segments 3–6 mm wide, basicopic ones of proximal pinnae greatly reduced or wanting. **Aerophores** absent. **Buds** lacking. **Veins** (12–)15–22 pairs per segment, lowermost 2–3 pairs from adjacent segments connivent at the sinus. **Indument** on costae and veins abaxially of moderately dense, spreading, acicular trichomes 0.1–0.2 mm, intervenal tissue glabrous, glands lacking, costal scales scattered, castaneous, shining, mostly 0.4–1 mm long, densely setulose, adaxially the lamina glabrous except along costae. **Sori** supramedial to submarginal, round, indusia moderately pubescent, trichomes 0.1 mm long, sporangial stalks without glands.

Lowland and montane forests, 100–700(–1500) m, Amazonas, San Martín, Loreto, Huánuco, Junín, and Cuzco.

Ecuador to Bolivia; southern Brazil.

Variety *grandis* is restricted to the Antilles and southern Florida, whereas var. *pallescens* (C. Chr.) A. R. Sm. occurs in the Greater Antilles, Central America, Venezuela and Colombia, Ecuador, and perhaps Bolivia. Herein, I raise var. *aequatorialis* to species rank (as *T. clivalis*).

Amazonas: Prov. Bagua, bank of Río Marañón above Cascadas de Mayasi, *Wurdack* 1951 (F, GH, NY, UC, US, USM). **San Martín:** Prope Tarapoto, *Spruce* 4066 (K, P). **Loreto:** Lower Río Nanay, *Ll. Williams* 308 (F), 372 (F), 379 (F, US). Dist. Iquitos, bank of Río Marañón, below Rancho Indiana, *Mexia* 6462 (BH, F, GH, MO, NY, U, UC, US). **Pasco:** Quillasú, *Soukup* 3292 (F, GH). **Junin:** La Merced, *Killip & Smith* 23542 (NY, US). Colonia del Perené, *Coronado* 241 (GH, UC). **Cuzco:** Prov. La Convención, Río Apurímac below San Martín above Hda. Luisiana, *Davis et al.* 1334 (F, GH, UC).

IId. ***Thelypteris*** subg. ***Steiropteris***.

Thelypteris subg. ***Steiropteris*** (C. Chr.) Iwatsuki, Mem. Coll. Sci. Kyoto, Ser. B. 31: 31. 1964. **Figure 5.**

Dryopteris subg. *Steiropteris* C. Chr., Biol. Arb. til. Eug. Warming 81. 1911. TYPE: *Dryopteris deltoidea* (Sw.) C. Chr. = *Thelypteris deltoidea* (Sw.) Proctor

Steiropteris (C. Chr.) Pic.-Ser., Webbia 28: 449. 1973.

Lamina 1-pinnate-pinnatifid, or pinnatifid with a few free pinnae in 2 extralimital species; proximal pinnae the longest or nearly so (except the type), distal pinnae gradually reduced and the lamina with a confluent, pinnatifid apex, or sometimes abruptly reduced with a subconform terminal pinna; aerophores often strongly developed at pinna bases; buds lacking or rarely present. **Veins** from adjacent segments meeting margin above sinus (sect. *Glaphyopteris*), or connivent at sinus (sect. *Steiropteris*) with a veinlike keel (pseudovein) extending from sinus toward costa, occasionally the veins uniting below sinus or with the pseudovein. **Indument** of acicular trichomes, these sometimes septate. **Sori** round, indusiate or exindusiate; sporangia glabrous, rarely setulose. **Spores** with few prominent, connected, winglike ridges or many shorter disconnected ones. $x = 36$.

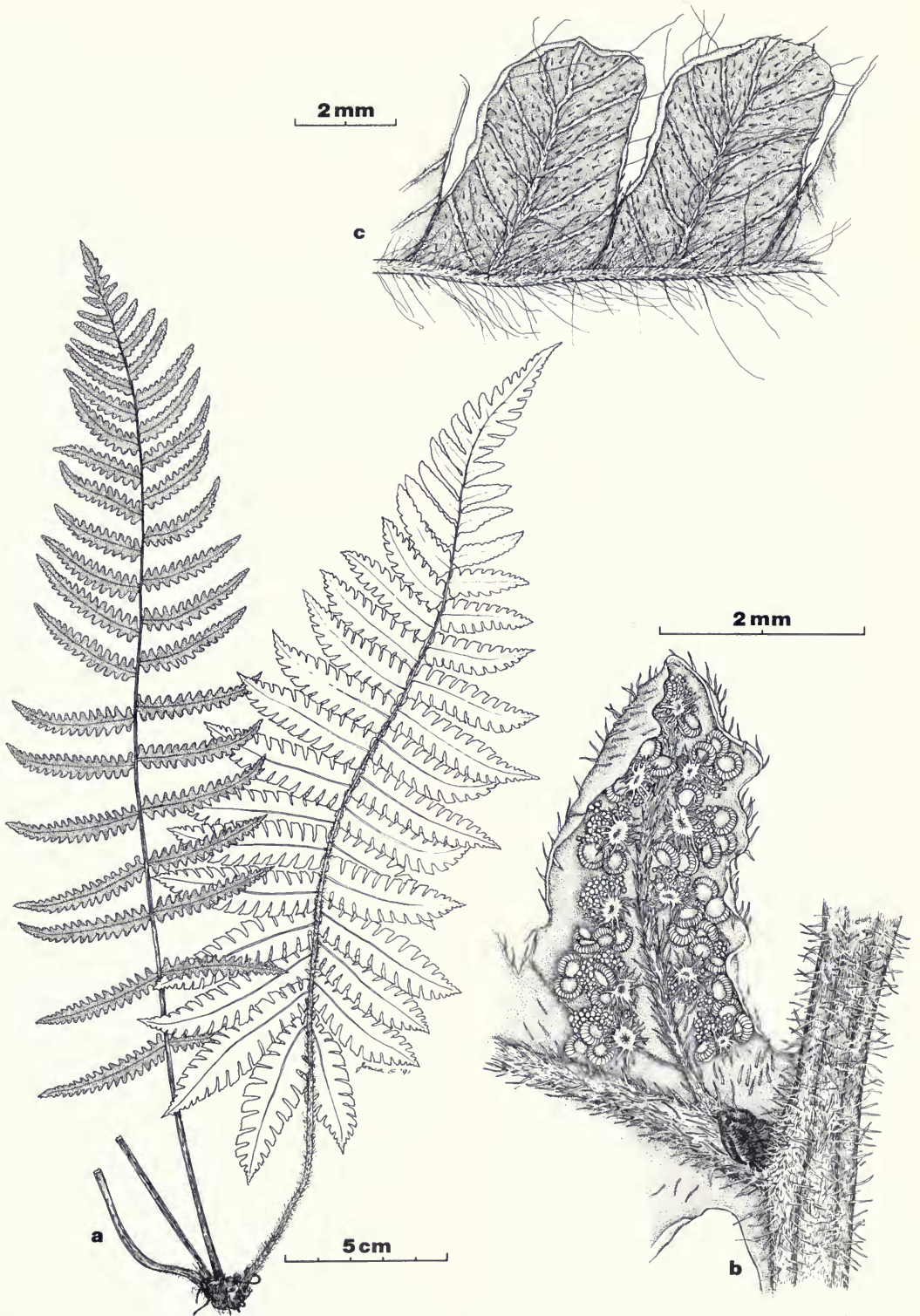


FIG. 5. Subgenus *Steiropteris*. *Thelypteris valdepilosa*: a, stem with fertile (l.) and sterile (r.) leaves; b, juncture of rachis and costa, abaxial side of fertile leaf, with aerophore; c, costa and sterile segments, adaxial side. (a, b from Herrera 3249, Costa Rica, uc; b from Foster et al. 8985, uc.)

Subgenus *Steiopteris* comprises 21 Neotropical species, from the Antilles, southern Mexico to Bolivia, and southern Brazil (Smith, 1980). In general aspect, several species most closely resemble certain species of subg. *Goniopteris*, and the two are perhaps more closely related to each other than to any other subgenus.

Key to Species of subg. *Steiopteris*

- a. Sinus keel (a cartilaginous, raised, often minutely pubescent pseudovein) lacking; veins (17–)20–45 pairs per segment, meeting margin above the sinus; indusia absent; laminar tissue between the veins often with sessile glands (sect. *Glaphyopteris*) b
 - b. Costae abaxially short-pubescent (0.1–0.2 mm) or with short and long nonseptate trichomes intermixed; costules and veins adaxially glabrous 57. **T. decussata**
 - b. Costae abaxially with dense, soft, septate trichomes 1–2 mm long; costules and veins adaxially with relatively dense, strigose trichomes up to 2 mm 58. **T. comosa**
- a. Sinus keel prominent; veins fewer than 22 pairs per segment, connivent at the sinus or sometimes uniting below sinus; indusia present or absent; laminar tissue between veins glandless (sect. *Steiopteris*) c
 - c. Sori exindusiate d
 - d. Scalelike aerophores at pinna bases; pinnae incised ca. $\frac{1}{3}$ – $\frac{1}{2}$ 59. **T. glandulosa**
 - d. Scalelike aerophores absent at pinna bases (small darkened swellings may be present); pinnae incised $\frac{2}{3}$ – $\frac{3}{4}$ 60. **T. pennellii**
 - c. Sori indusiate e
 - e. Orangish glands present on receptacle; fronds subdimorphic, the fertile long-petioled and with contracted pinnae 61. **T. valdepilosa**
 - e. Glands absent on receptacle; fronds monomorphic or nearly so f
 - f. Aerophores present at pinna bases, peglike 62. **T. leprieurii**
 - f. Aerophores absent at pinna bases g
 - g. Indusia minute, spatulate, easily overlooked among mature sporangia; segments 5–8 mm wide 60. **T. pennellii**
 - g. Indusia conspicuous; segments 3–5 mm wide 63. **T. gardneriana**

57. ***Thelypteris decussata*** (L.) Proctor, Bull. Inst. Jamaica, Sci. Ser. 5: 59. 1953.

Stem massive, suberect, scales tan (whitish when young), dull, ovate, glabrous, appressed. **Leaves** (100–)150–350 cm long, croziers mucilaginous. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal pinnae not reduced. **Petiole** ca. 50–150 cm × 5–10 mm, brownish to purplish brown, lacking scales above the base. **Rachis** pubescent or glabrescent abaxially, trichomes mostly 0.1–0.25 mm. **Pinnae** sessile, 18–25(–45) × 1.8–3(–4.5) cm, deeply pinnatifid within 1 mm of costae, proximal ones narrowed at base, not auriculate, segments 2–5 mm wide, margins with numerous flexuous septate trichomes. **Aerophores** scalelike at pinna bases, 5–10 mm long, with shorter, threadlike ones 1–3 mm at bases of costules. **Buds** lacking. **Veins** (17–)25–35(–45) pairs per segment, lowermost pair from adjacent segments meeting margin just above

Reference

SMITH, A. R. 1980. Taxonomy of *Thelypteris* subgenus *Steiopteris*, including *Glaphyopteris* (Pteridophyta). Univ. Calif. Publ. Bot. 76: 1–38.

sinus, sinus keel lacking. **Indument** on costae abaxially of moderately dense to dense, spreading, non-septate trichomes mostly less than 0.1 mm, laminar tissue abaxially lacking trichomes but often with reddish to orangish sessile resinous glands, costal scales lacking, adaxially with numerous stout trichomes to ca. 1 mm on costae, a few on costules. **Sori** inframedial to medial, round, exindusiate, often with receptacular glands.

Montane rain forests, 500–1300 m, Pasco, Junín, Ayacucho, Cuzco, and Madre de Dios.

Guatemala to Panama; Antilles; Colombia to Guianas and Bolivia; southern Brazil.

Lechler 2356 (G, K, L), from San Gabán, Puno, was previously (Smith, 1980) and tentatively named var. *velutina* (Sodirol) A. R. Sm., but no additional material has come to my attention, and I am now uncertain of the varietal identity of this specimen.

Key to Varieties

- a. Lamina with red to orange, sessile glands abaxially; pinnae greater than 2 cm wide 57a. var. **decussata**
a. Lamina eglandular abaxially; pinnae less than 2 cm wide 57b. var. **mapiriensis**

57a. *Thelypteris decussata* var. **decussata**.

Polypodium decussatum L., Sp. pl. 2: 1093. 1753.

TYPE: Petiver's Pterigraphia Amer. 61, t. 2, f. 5, 1712, which is a redrawing of Plumier's Tract. fil. amer. t. 24, 1705, illustrating a plant said to have come from Martinique, Morne de la Calé-
basse.

Glaphyopteris decussata (L.) Fée, Crypt. vasc. Brésil 2: 40. 1873.

Dryopteris decussata (L.) Urban, Symb. antill. 4: 19. 1903.

Montane rain forests, 500–1100 m, Pasco and Cuzco.

Antilles; Guatemala to Panama; Colombia to French Guiana and Peru.

Pasco: Pichis Trail, San Nicolás, (as Junín), *Killip & Smith 26030* (GH, NY, US). **Cuzco:** Prov. Quispicanchi, entre Inambari y 15 Mil, *Vargas 16503* (GH).

57b. *Thelypteris decussata* var. **mapiriensis** (Rosenst.) A. R. Sm., Univ. Calif. Publ. Bot. 76: 16. 1980.

Dryopteris mapiriensis Rosenst., Repert. Spec. Nov. Regni Veg. 6: 313. 1909. TYPE: Bolivia, La Paz, San Antonio near Mapiri, *Buchtien 1131* (holotype, not found at s; isotypes, BM!, US!).

Thelypteris mapiriensis (Rosenst.) Alston, J. Wash. Acad. Sci. 48: 234. 1958.

Montane rain forests, 700–1300 m, Junín, Ayacucho, and Madre de Dios.
Peru; Bolivia.

Junín: Schunke Hda., above San Ramón, *Killip & Smith 24650* (NY). **Ayacucho:** Prov. La Mar, San Jose to Huanhuachayo, between Tambo San Miguel, Ayna, and Hda. Luisiana, *Dudley 11945* (GH). **Madre de Dios:** Prov. Manú, Cerro de Pantiacolla, Río Palotoa 10–15 km NNW of Shintuya, *R. Foster et al. 10906* (F, USM).

58. *Thelypteris comosa* (Morton) Morton, Amer. Fern J. 51: 38. 1961.

Dryopteris comosa Morton, J. Wash. Acad. Sci. 28: 528. 1938. TYPE: Peru, Pasco, Dos de Mayo,

Pichis Trail (as Junín), *Killip & Smith 25872* (holotype, US!; isotype, NY!).

Stem massive, suberect, scales tan (whitish when young), dull, ovate, glabrous, appressed. **Leaves** ca. 110 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal pinnae not reduced or 1–2 pairs slightly reduced. **Petiole** ca. 45 cm × 8 mm, brownish, lacking scales above the base. **Rachis** pubescent abaxially, trichomes mostly 0.1–0.2 mm and a few up to 2 mm. **Pinnae** sessile, 15–25 × 2.5–3.5 cm, deeply pinnatifid within 1 mm of costae, proximal ones narrowed at base, not auriculate, segments 3–4 mm wide. **Aerophores** scalelike at pinna bases, to 7 mm long, with shorter thread-like ones at bases of costules. **Buds** lacking. **Veins** 25–30 pairs per segment, lowermost pair from adjacent segments meeting margin just above sinus, sinus keel lacking. **Indument** on costae and veins abaxially of moderately dense to dense, spreading, sometimes septate trichomes mostly 1–2 mm, laminar tissue lacking glands or very sparsely glandular, with a few trichomes, costal scales lacking, adaxially with numerous stout trichomes to 2 mm on costae and costules. **Sori** medial, round, exindusiate, lacking receptacular glands.

Montane rain forests, 1700–2100 m, Pasco and Cuzco.

Known only from Peru.

Cuzco: Prov. La Convención, ca. 17 km walking distance NE from Hda. Luisiana and Apurímac river, above Camp 3, *Dudley 11271* (GH).

59. *Thelypteris glandulosa* (Desv.) Proctor var. **brachyodus** (Kunze) A. R. Sm., Phytologia 34: 233. 1976.

Polypodium brachyodus Kunze, Linnaea 9: 48. 1834. TYPE: Peru, (Huánuco), "in sylv. umbros. Cuchero" (specimen), Pampayacu, *Poeppig* (holotype, LZ, destroyed; isotype, w!).

Dryopteris brachyodus (Kunze) Kuntze, Rev. gen. pl. 2: 812. 1891.

Dryopteris glandulosa (Desv.) C. Chr. var. *brachyodus* (Kunze) C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 10: 172. 1913.

Thelypteris brachyodus (Kunze) Ching, Bull. Fan Mem. Inst. Biol., Bot. 6: 286. 1936.

Stem short-creeping, scales few, brown, dull, ovate, sparsely pubescent to glabrous. **Leaves** few, mostly 75–150 cm long. **Lamina** thick-chartaceous, 1-pinnate-pinnatifid, proximal pinnae not reduced. **Petiole** 30–75 cm × 4–8 mm, brownish, lacking scales above the base. **Rachis** usually pubescent abaxially, trichomes mostly 0.1–0.3 mm long. **Pinnae** sessile to short-stalked 1–4 mm, mostly 10–25 × 2.5–4 cm, shallowly pinnatifid ca. $\frac{1}{3}$ – $\frac{1}{2}$ their width, proximal ones slightly narrowed at base, not auriculate, segments 5–8 mm wide. **Aerophores** commonly scalelike at pinna bases, 1–2 mm long. **Buds** lacking. **Veins** mostly 14–22 pairs per segment, lower 3–5 pairs from adjacent segments usually running alongside a raised minutely pubescent (trichomes 0.1 mm) sinus keel (false vein) and connivent with each other or with the sinus keel. **Indument** on costae and veins abaxially of dense, spreading, acicular trichomes mostly ca. 0.1 mm, laminar tissue glabrous and lacking glands, costal scales tan, appressed, linear-lanceolate, lamina adaxially glabrous except for trichomes ca. 0.1 mm along costae. **Sori** inframedial to medial, round to often oblong, exindusiate, lacking receptacular glands.

Lowland rain forests, 100–700 m, Amazonas, Loreto, and Huánuco.

Southern Mexico (Chiapas); Belize and Guatemala to Costa Rica; Colombia; Ecuador; Peru.

Three varieties are known, with var. *glandulosa* in the Lesser Antilles and the Guianas to Colombia and var. *longipilosa* A. R. Sm. from Costa Rica and Panama to Ecuador, primarily on the Pacific slope.

The collections by Sagástegui and Moran are similar to typical material in venation and lamina dissection but differ in having glabrous costae abaxially, strictly opposite pinnae, sori more elongate along the veins, and apparently in lacking aerophores at the pinna bases. These two collections may represent an undescribed species.

Amazonas: Prov. Bagua, Montenegro-Chiriaco, *Sagástegui 5925* (GH). **Loreto:** Prov. Maynas, Yanamono tourist camp, 50 mi NE of Iquitos, *Vásquez & Jaramillo 516* (F, MO). Balsapuerto, *Killip & Smith 28478* (NY, US). Prov. Maynas, ca. 50 miles downriver on the Amazonas at Jensen's Explorama lodge, *Moran 3727* (MO, UC).

60. *Thelypteris pennellii* A. R. Sm., Univ. Calif.

Publ. Bot. 76: 28. 1980. TYPE: Colombia, Tolima, "La Virginia," Libano, *Pennell 3265* (holotype, NY!; isotype, US!).

Stem not known, probably short-creeping. **Leaves** to 140 cm long. **Lamina** thick-chartaceous, 1-pinnate-pinnatifid, proximal pinnae not reduced, apex pinnatifid, confluent or free. **Petiole** to ca. 80 cm × 8 mm, stramineous to tan, lacking scales above the base. **Rachis** sparsely pubescent abaxially, trichomes 0.1 mm long. **Pinnae** opposite to subopposite throughout, sessile to short-stalked 1 mm, 15–20 × 2.5–3.5 cm, pinnatifid ca. $\frac{2}{3}$ – $\frac{3}{4}$ their width (to 4–6 mm from costae), proximal ones not narrowed at base, not auriculate, segments 5–8 mm wide. **Aerophores** absent or reduced to a small, darkened swelling. **Buds** lacking. **Veins** up to 18 pairs per segment, lower 2–3 pairs from adjacent segments running alongside a minutely pubescent sinus keel (that extends from sinus nearly to costa). **Indument** on costae abaxially of scattered, acicular trichomes 0.1 mm, veins and laminar tissue glabrous, costal scales tan, appressed, linear, adaxially the lamina glabrous except for trichomes ca. 0.1 mm along costae. **Sori** inframedial to subcostular, round, indusia spatulate, sparingly ciliate to glabrous, evanescent or obscured by mature sporangia, lacking receptacular glands.

Montane, rain forest, Huánuco.
Colombia, Peru.

Huánuco: Pampayacu, *Kanehira 132* (GH, US), *133* (GH).

61. *Thelypteris valdepilosa* (Baker) Reed, Phytologia 17: 323. 1968. **Figure 5.**

Nephrodium valdepilosum Baker, J. Bot. 19: 204. 1881. LECTOTYPE (chosen by Smith, 1980): Colombia, Dept. Antioquia, *Kalbreyer 1871* (κ!; isolecotype, κ!).

Dryopteris valdepilosa (Baker) C. Chr., Index fil. 299. 1905.

Steiropteris valdepilosa (Baker) Pic.-Ser., Webbia 28: 451. 1973.

Stem suberect, scales brown, shining, lanceolate, densely setulose on surface and margins. **Leaves** several, subdimorphic, the fertile with longer petioles and narrower pinnae than the sterile, 45–75 (–120) cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal pinnae not reduced or lowest pair slightly reduced. **Petiole** 15–20 cm ×

3 mm, brownish, lacking scales above the base, densely pubescent with short trichomes 0.1–0.2 mm, the sterile intermixed with long, silky, septate trichomes 2–4 mm. **Rachis** densely pubescent abaxially, trichomes as on petioles. **Pinnae** sessile, 4–6(–12) × 1–1.7(–3) cm, deeply pinnatifid 1–2 mm from costae, proximal ones slightly narrowed at base, not auriculate, segments 2–5 mm wide, the fertile narrower. **Aerophores** peglike, to 1 mm at pinna bases. **Buds** lacking. **Veins** 7–10 pairs per segment, lower pair from adjacent segments running to or just above sinus, minutely pubescent keel running from sinus nearly to costa. **Indument** on costae and veins (sterile lamina) abaxially of dense, acicular trichomes mostly 1–3 mm long, 0.1–0.3 mm on fertile lamina, laminar tissue of both fronds with adpressed trichomes 0.2–0.3 mm, also with inconspicuous glands mainly along veins, costal scales few, linear, appressed, lamina adaxially with adpressed trichomes 0.2–0.3 mm on and between veins, the sterile also with a few long trichomes 1–3 mm on veins. **Sori** medial, round, indusium short-setose, trichomes 0.2–0.3 mm, receptacle with stalked globose orangish glands.

Montane rain forest, 1000 m, Pasco.

Costa Rica and Panama; Colombia to Peru.

The recent finding of this very distinct and rare, but apparently widespread, species emphasizes the need for much additional collecting in Peru and elsewhere in Latin America. The fertile and sterile fronds show remarkable dimorphism in pubescence.

Pasco: Oxapampa, Pichis Valley, San Matías Ridge, 10–12 km SW of Puerto Bermúdez, above Santa Rosa

Key to Varieties

- a. *Indusia glandular*, without trichomes 62b. var. **glandifera**
- a. *Indusia eglandular* to *glandular*, with at least a few trichomes b
- b. Trichomes on petiole, rachis, and costae abaxially moderately dense, not septate, mostly 0.2–1 mm long 62a. var. **leprieurii**
- b. Trichomes on petiole, rachis, and costae abaxially dense, obviously septate, mostly 1–2 mm long 62c. var. **incana**

62a. ***Thelypteris leprieurii* var. *leprieurii*.**

Nephrodium leprieurii Hooker, Sp. fil. 4: 106. 1862.

TYPE: French Guiana, *Leprieur* (holotype, K!; frag., BM!; isotypes, B!, US!).

Dryopteris leprieurii (Hooker) Kuntze, Rev. gen. pl. 2: 813. 1891.

Steiropteris leprieurii (Hooker) Pic.-Ser., Webbia 28: 451. 1973.

de Chivis, trail to Loma Linda, R. Foster et al. 8985 (MO, UC, USM).

62. ***Thelypteris leprieurii* (Hooker) R. Tryon, Rhodora 69: 6. 1967.**

Stem creeping to suberect, scales brown, shining, lanceolate, setulose on surface and margins. **Leaves** several, 60–140 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal pinnae not reduced, apex confluent and pinnatifid. **Petiole** 30–70 cm × 3–6 mm, tan to brownish, lacking scales above the base, pubescent with trichomes 0.1–1.5 mm. **Rachis** densely pubescent abaxially, trichomes uniformly short, 0.1–0.2 mm, or mixed with long trichomes up to 1.5 mm, or trichomes mostly long, 1–2 mm, septate. **Pinnae** sessile, 8–17 × 1.5–3 cm, deeply pinnatifid 0.5–2 mm from costae, proximal commonly narrowed at base (segments ca. half the length of the longest), not auriculate, segments 3–5 mm wide. **Aerophores** peglike, 0.5–2 mm at pinna bases. **Buds** lacking. **Veins** 10–16 pairs per segment, lowermost pair from adjacent segments running to or just above sinus, minutely pubescent keel running from sinus nearly to costa. **Indument** on costae and veins (sterile lamina) abaxially of moderately dense to dense, acicular trichomes mostly 0.2–1.5 mm long, longer trichomes sometimes septate, laminar tissue usually glabrous, glands lacking, costal scales absent, lamina adaxially glabrous or with stout trichomes on veins. **Sori** inframedial to medial, round, indusium glabrous, short-setose (trichomes 0.2–0.3 mm), or glandular, receptacle lacking glands.

Montane rain forests, ravines, 700–1200 m, San Martín, Huánuco, and Junín.

Trinidad; Colombia to Bolivia and French Guiana, southern Brazil.

San Martín: Mt. Campana, prope Tarapoto, *Spruce* 4660 (K). **Huánuco:** Tingo María (as San Martín), *Allard* 22559 (us). Prov. Huánuco, Tingo María, *Tryon & Tryon*

5279 (GH, USM). **Junín:** Chanchamayo valley, *Schunke 139* (F), 665 (F).

62b. *Thelypteris leprieurii* var. *glandifera* A. R. Sm., Univ. Calif. Publ. Bot. 76: 25. 1980. TYPE: Bolivia, La Paz, Prov. Larecaja, Copacabana, *Krukoff 11176* (holotype, us!; isotypes, G!, GH!, NY!, S!).

Lowland and montane rain forests, 340–1700 m, Pasco, Junín, and Puno.

Peru; Bolivia; central Brazil.

Pasco: Prov. Oxapampa, Quebrada Castilla, near Villa América, *León & Young 1037* (UC, USM). Prov. Oxapampa, Gran Pajonal, 2–3 km N of Chequitavo, *D. Smith 5097* (MO, UC, USM). Pichis Trail, Yapas (as Junín), *Killip & Smith 25497* (NY). **Junín:** Schunke Hacienda, above San Ramón, *Killip & Smith 24566* (NY). **Puno:** San Gabán (as St. Gavan), *Lechler 2418* (BM).

62c. *Thelypteris leprieurii* var. *incana* (Christ) A. R. Sm., Univ. Calif. Publ. Bot. 76: 26. 1980.

Aspidium incanum Christ, Hedwigia 44: 367. 1905.

TYPE: Brazil, Amazonas, Puritisa, Juruá Miry, Rio Jurúa, *Ule 5763* (holotype, p; isotypes, B!, G!, K!, frag., BM!).

Dryopteris incana (Christ) C. Chr., Index fil. 272. 1905. *Steiopteris incana* (Christ) Pic.-Ser., Webbia 28: 451. 1973.

Lowland rain forest, Loreto.

Ecuador; Peru; Amazonian Brazil.

Loreto: Near Pobre Alegre, 40–45 km upriver from Atalaia do Norte, Brazil, along Río Javari, *Breedlove 35515* (DS, MO).

63. *Thelypteris gardneriana* (Baker) Reed, Phytologia 17: 278. 1968.

Nephrodium gardnerianum Baker in C. Martius, Fl. bras. 1(2): 474. 1870. TYPE: Brazil, Rio de Janeiro, Serra do Orgãos, *Gardner 190* (holotype, K!; isotypes, BM!, P!).

Dryopteris densiloba C. Chr., Index fil. 261. 1905, nom. nov. for *Nephrodium gardnerianum* and with the same type.

Dryopteris supralineata Rosenst., Repert. Spec. Nov. Regni Veg. 8: 277. 1910. TYPE: Brazil, São Paulo, Serra do Mar, *Wacket 212* (holotype, not found in s; isotypes, BM!, NY!, UC!; probable isotypes, *Rosenst. exs. 437*, B!, BM!, L!, NY!, US!).

Steiopteris gardneriana (Baker) Pic.-Ser., Webbia 28: 451. 1973.

Stem short-creeping, scales brown, shining, lanceolate, setulose on surface and margins. **Leaves** several, mostly 50–100 cm long. **Lamina** chartaceous, 1-pinnate-pinnatifid, proximal pinnae not reduced or lowermost pair slightly reduced, apex confluent and pinnatifid. **Petiole** 30–60 cm × 2–3 mm, tan to brownish, lacking scales above the base, pubescent with trichomes 0.1–0.2 mm. **Rachis** moderately pubescent abaxially, trichomes 0.1–0.3 mm. **Pinnae** sessile, 5–12 × 1.6–2.5 cm, deeply pinnatifid 1.5–2.5 mm from costae, proximal pinnae commonly narrowed at base (segments ca. half the length of the longest), not auriculate, segments 3–5 mm wide. **Aerophores** absent. **Buds** lacking. **Veins** 6–12 pairs per segment, lowermost pair from adjacent segments running to or just above sinus, minutely pubescent keel running from sinus nearly to costa. **Indument** on costae and veins abaxially of scattered, acicular trichomes mostly 0.1–0.3 mm long, laminar tissue glabrous, glands lacking, costal scales absent, lamina adaxially glabrous except for trichomes 0.1–0.3 mm along costae. **Sori** medial, round, indusium short-setose (trichomes 0.1–0.2 mm), receptacle lacking glands.

Rocky slopes, 2400–2800 m, Cuzco.

Colombia; Venezuela; Ecuador; Galápagos; Peru; Bolivia; southern Brazil. Rare everywhere except in southern Brazil.

Cuzco: Prov. Paucartambo, Pillahuata, B. Aires, *Vargas 16740* (GH).

IIc. *Thelypteris* subg. *Goniopteris*.

Thelypteris subg. *Goniopteris* (Presl) Duek, Adanson, II. 11: 720. 1971. **Figure 6.**

Goniopteris Presl, Tent. pterid. 181. 1836. TYPE: *Goniopteris crenata* (Sw.) Presl [= *Thelypteris poiteana* (Bory) Proctor].

Lamina simple to usually 1-pinnate or 1-pinnate-pinnatifid; proximal pinnae the longest or nearly so, not reduced, rarely a few slightly reduced, distal pinnae gradually shortened and the lamina with a confluent, pinnatifid apex, or the lamina with a conform apical pinna; aerophores lacking or rarely present (*T. lugubrifformis*); buds often present in axil(s) of distal pinnae, rarely in axil(s) of proximal pinnae (*T. poiteana*). **Veins** commonly connivent at the sinus or uniting below sinus, or forming a series of aeroles each with a single excurrent vein (veins meniscoid). **Indument**

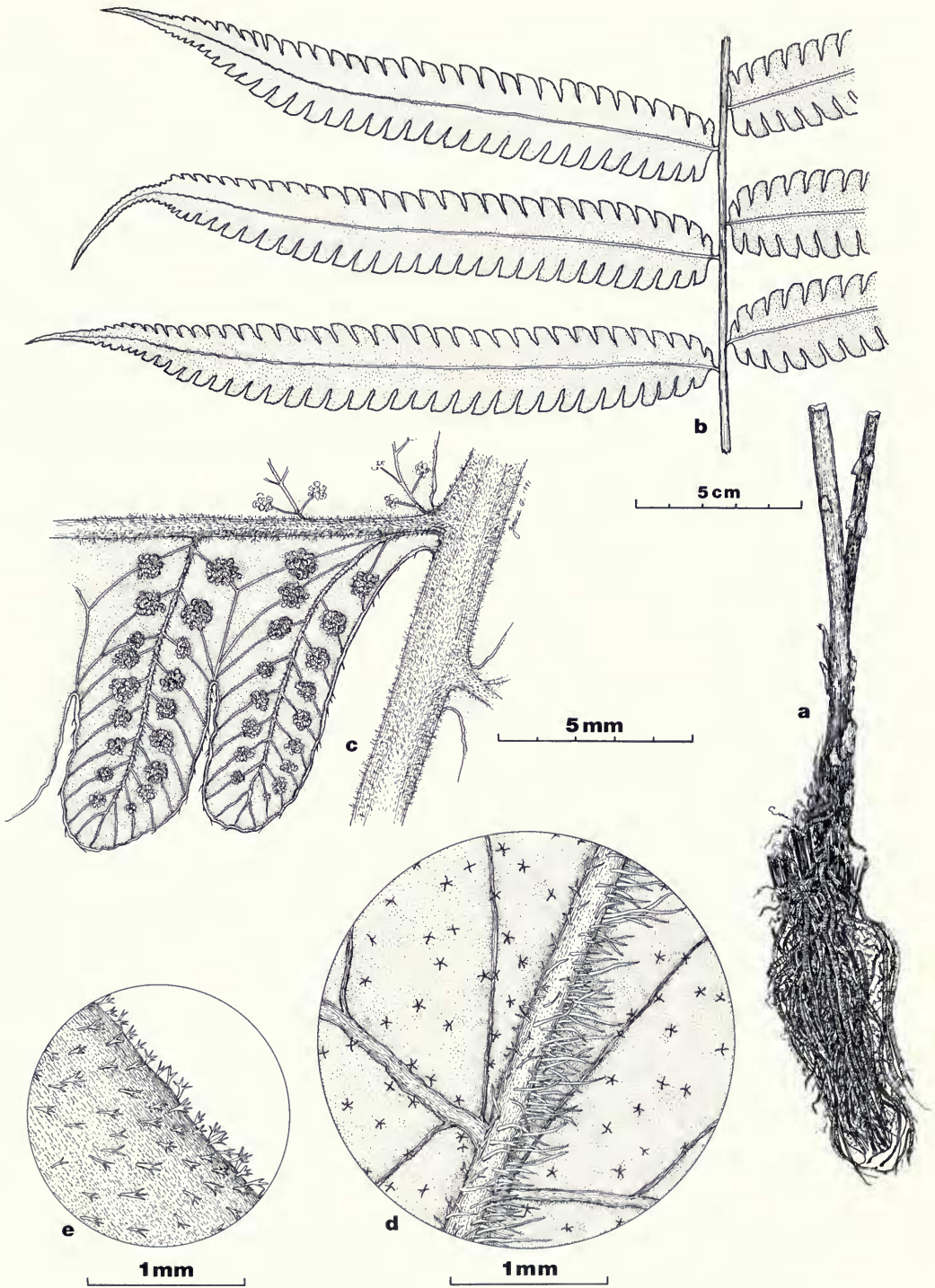


FIG. 6. Subgenus *Goniopteris*. *Thelypteris biolleyi*: a, portion of stem and petiole; b, portion of lamina; c, pinnules, abaxial side; d, indument of segment base; e, indument at edge of rachis. (a, c, d, e from *Mexia* 6184, UC; b from Fisher 35395, Mexico, F.)

of acicular and usually furcate, stellate, or anchor-shaped trichomes (lacking in a few spp.), these most evident on stem apex scales and in adaxial grooves, but also often on axes and lamina abaxially, rarely branched trichomes lacking. Sori round, indusia round-reniform, up to ca. 1 mm in diameter or reduced to a small fragment, or sori exindusiate; sporangia glabrous, setose, or with stellate or furcate trichomes from capsules or stalk. Spores with few to many prominent connected or disconnected wings. $x = 36$.

Subgenus *Goniopteris* comprises 80–100 Neotropical species, from Florida, the Antilles, and southern Mexico to northern Argentina and Paraguay. Species are most numerous in lowland and montane rain forests and are virtually absent at elevations above 2000 m. A few species are semi-weedy in shaded plantations (coffee, cacao). Many Peruvian species produce small buds in the axils of distal pinnae. These buds often remain undeveloped on mature fronds but perhaps are impor-

tant in establishment of new plants when the fronds are senescent and decaying.

Several Peruvian species, i.e., *T. macrotis*, *T. semihastata*, and *T. clypeata*, completely lack the stellate or furcate trichomes which are the most constant characteristic of the subgenus. The last species has venation very much like subg. *Meniscium*, and could be evolutionarily transitional to that subgenus; however, *T. clypeata* also has large indusia, which are unknown in *Meniscium*. The loss of branched trichomes in *T. macrotis* and *T. semihastata* seems likely to have occurred independently from *T. clypeata*. The most primitive element in the subgenus may be *T. lugubrifformis*, which has a lamina aspect much like subg. *Steiropteris*; it is also the only species in the subgenus with well-developed aerophores.

References

See CHRISTENSEN (1913) and SMITH (1983) under the family references.

Key to Species of subg. *Goniopteris*

- a. Lamina gradually narrowed distally into a pinnatifid apex b
- b. Lamina pinnatifid, or 1-pinnate-pinnatifid with a few pinnae proximally c
- c. Pinnae entire or subentire, not auricled; lamina glabrous between veins adaxially 64. **T. pinnatifida**
- c. Pinnae lobed, at least the proximal ones, also auricled at acroscopic base; lamina with adpressed trichomes between the veins adaxially 65. **T. jamesonii**
- b. Lamina 1-pinnate to just short of the apex d
- d. Lamina between veins on both sides with appressed, sessile stellate trichomes bearing 3–5 arms; acicular trichomes lacking on axes abaxially; sori exindusiate 76. **T. biolleyi**
- d. Lamina between veins glabrous or with acicular trichomes, or trichomes furcate or stellate, arms not appressed; acicular trichomes present on axes abaxially; sori indusiate or exindusiate e
- e. Trichomes on axes and lamina abaxially anchor-shaped, i.e., with two retrorse hooks at tip; sori exindusiate; veins uniting at an obtuse angle below sinus with an excurrent vein to sinus 77. **T. ancyriothrix**
- e. Trichomes on axes and lamina abaxially acicular, furcate, or stellate; sori exindusiate or indusiate, indusium usually at least 0.2 mm in diameter; veins connivent at sinus f
- f. Stellate trichomes absent from all parts of plant; pinnae auriculate at the acroscopic base g
- g. Buds present in axil(s) of distal pinnae; lamina deltate; proximal pinnae not reduced 66. **T. macrotis**
- g. Buds absent; lamina narrowly lanceate; several pairs of proximal pinnae reduced 67. **T. semihastata**
- f. Stellate and/or furcate trichomes present on axes and on rhizome apex scales; pinnae nonauriculate (except sometimes *T. jamesonii*) h
- h. Pinnae shallowly lobed to $\frac{1}{3}$ (– $\frac{1}{2}$) their width, lobes often broader than long; pinnae slightly auriculate at the acroscopic base; buds lacking 65. **T. jamesonii**
- h. Pinnae lobed at least $\frac{1}{3}$ or more of their width, not auriculate at the acroscopic base; bud(s) commonly present in axils of distal pinnae i

- i. Adaxial surface of lamina between veins with adpressed trichomes; aerophores peglike at pinna bases 69. **T. lugubriformis**
- i. Adaxial surface of lamina between veins glabrous; aerophores lacking j
- j. Rachis and costae abaxially densely stellate-pulverulent, lacking acicular trichomes 70. **T. eggersii**
- j. Rachis and costae abaxially with stellate, furcate, and acicular trichomes intermixed, or trichomes mostly acicular k
- k. Sori exindusiate; trichomes on both sides of rachis deep red; buds lacking 71. **T. erythrothrix**
- k. Sori indusiate; trichomes of rachis hyaline or mixed with reddish ones; buds commonly present in axils of distal pinnae l
- l. Distal pinnae subabruptly reduced, lamina with a hastate, pinnatifid apex; costal trichomes abaxially mostly 0.2–1.5 mm long, rather dense, many forked or stellate 72. **T. biformata**
- l. Distal pinnae gradually reduced; costal trichomes mostly 0.1–0.2(–0.3) mm long, sparse to moderately dense, mostly simple .. 68. **T. abrupta**
- a. Lamina with a terminal pinna that resembles that lateral ones m
- m. Pinnae entire to very shallowly crenate, 3–5 pairs; areoles 12–17-seriate between costa and margin; indusia large, vaulted, 1–1.5 mm in diameter 82. **T. clypeata**
- m. Pinnae crenate or more divided, usually more than 4 pairs; areoles less than 8-seriate, or lacking with veins connivent at the sinus; indusia commonly much less than 1 mm in diameter, or lacking, not vaulted n
- n. Lamina between veins on both sides with sessile, stellate trichomes with 3–5 appressed arms; trichomes of abaxial costae all stellate, none acicular o
- o. Pinnae shallowly incised less than $\frac{1}{4}$ the distance to costae; veins uniting in 3–6 pairs between costa and margin 78. **T. schunkei**
- o. Pinnae incised ca. $\frac{1}{3}$ – $\frac{1}{2}$ the distance to costae; veins uniting in 1–3 pairs between costa and margin 79. **T. pennata**
- n. Lamina between veins on both sides glabrous or with acicular or stalked-furcate trichomes, lacking appressed stellate trichomes; trichomes of abaxial costae a mixture of acicular, furcate, and stellate trichomes, at least some stalked p
- p. Pinnae crenate or very shallowly lobed less than $\frac{1}{5}$ the distance to costae; buds in axils of proximal pinnae; trichomes of costae and rachis abaxially acicular; sori exindusiate 81. **T. poiteana**
- p. Pinnae shallowly to deeply lobed $\frac{1}{3}$ or more the distance to costae; buds lacking or in axils of distal pinnae; at least some trichomes of costae and rachis abaxially furcate or stellate; sori indusiate or exindusiate q
- q. Pinnae incised $\frac{1}{3}$ – $\frac{2}{5}$ the distance to costae r
- r. Indusia present, small, often hidden in mature sori; costae lacking scales abaxially 74. **T. juruensis**
- r. Indusia absent; costae abaxially with tan, narrow, appressed scales 75. **T. tryonorum**
- q. Pinnae incised $\frac{1}{2}$ or more the distance to costae s
- s. Proximal pair of veins from adjacent segments uniting below the sinus at an obtuse angle, with an excurrent vein to sinus; sori exindusiate; buds lacking 80. **T. tetragona**
- s. Proximal pair of veins running to sinus, sometimes connivent just below sinus at an acute angle; sori indusiate or seemingly exindusiate; buds commonly present in axils of distal pinnae t
- t. Proximal pinnae cuneate at base; costal trichomes abaxially mostly acicular, a few furcate 73. **T. tristis**
- t. Proximal pinnae truncate at base; costal trichomes abaxially a mixture of stellate, furcate, and acicular trichomes u

- u. Lamina between veins adaxially with numerous, appressed trichomes; peglike aerophores present at base of largest pinnae abaxially . . . 69. **T. lugubriformis**
- u. Lamina between veins glabrous adaxially; aerophores absent 72. **T. biformata**

64. **Thelypteris pinnatifida** A. R. Sm., Fl. Ecuador 18: 110. 1983. TYPE: Ecuador, Prov. Pastaza, Río Bobonaza, *Spruce 5293* (holotype, NY!; isotypes, B!, K!, P!).

Stem short-creeping to ascending or suberect, caudex ca. 1 cm or less in diameter, scales light brown, dull, ovate-lanceolate, glabrous or minutely and sparingly setulose with trichomes 0.1 mm. **Leaves** several, clustered, mostly 12–30 cm long. **Petiole** 3–12 cm × 0.6–1.0 mm, tan, glabrescent or with long acicular trichomes and a few short stellate or furcate ones. **Lamina** herbaceous, not verrucose, pinnatifid or with 1–2(–3) pairs of subentire free pinnae proximally. **Buds** lacking. **Rachis** pubescent abaxially, trichomes hyaline or red-tipped, stiff, acicular, 0.5–1 mm, furcate or stellate trichomes absent or relatively few adaxially, 0.1 mm long. **Segments** (pinnae in more divided leaves) mostly 0.8–1.8 cm × 4–7 mm, entire, rounded or truncate at tip, lamina incised nearly or quite to rachis at base of lamina, ca. 1/2 or less in distal half, proximal free pinnae, if present, often subauriculate at acroscopic base. **Veins** 8–13 pairs per segment, simple or 1(–2)-forked, proximal pair (or 1 1/2 pairs) from adjacent segments connivent at sinus. **Indument** abaxially on costae and veins of moderately dense to dense, spreading, often red-tipped, acicular trichomes 0.3–1 mm, furcate and stellate trichomes lacking, laminar tissue glabrous, veins and laminar tissue glabrous adaxially. **Sori** medial, indusia reddish brown, setose along margin; sporangia glabrous.

Along stream banks, lowland rain forests, 200–400 m, infrequent in Peru: Loreto, Ucayali, and Madre de Dios.
Ecuador to Bolivia.

Loreto: Above Pongo de Manseriche, mouth of Río Santiago, *Mexia 6293* (BH, F, G, GH, MO, NY, UC). **Ucayali:** Prov. Coronel Portillo, Pucallpa–Lima Hwy, Km 85, *McDaniel 13944* (GH, MO, USM). Prov. Coronel Portillo, Bosque von Humboldt, along Quebrada Tahuahillo, *Young 949* (F). **Madre de Dios:** Prov. Manú, Manú Park, Cocha Cashu uplands, *Núñez 6119* (MO).

65. **Thelypteris jamesonii** (Hooker) R. Tryon, *Rhodora* 69: 6. 1967.

Nephrodium jamesonii Hooker, Sp. fil. 4: 66. 1862. LECTOTYPE (chosen by Christensen, 1913, p. 227): Ecuador, Río Napo, *Jameson 761* (K!).

Dryopteris jamesonii (Hooker) C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 10: 227. 1913.

Dryopteris warmingii C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 10: 227. 1913. TYPE: Brazil, Minas Gerais, Lagoa Santa, *Warming 1864* (holotype, c).

Dryopteris macrotis var. *nephrodioides* Rosenst., *Repert. Spec. Nov. Regni Veg.* 7: 298. 1909. TYPE: Peru, Mt. Campaña, *Spruce 4658* (isotype, P).

Stem suberect to erect, caudex up to 2 cm in diameter, scales light brown, dull, ovate-lanceolate, with simple and furcate trichomes 0.1–0.2 mm. **Leaves** several, clustered, (15–)20–60(–100) cm long, sometimes slightly dimorphic with fertile longer-petioled and with slightly contracted pinnae. **Petiole** 5–60 cm × 1–4 mm, tan to brown, glabrescent or with acicular and short-stellate or furcate trichomes. **Lamina** herbaceous, not verrucose, 1-pinnate-pinnatifid to about the middle (and then with a long-pinnatifid apex) or to near the tip (and with a short-pinnatifid apex). **Buds** lacking. **Rachis** with a mixture of stiff, acicular, sometimes red-tipped trichomes 0.5–1 mm and furcate or stellate ones 0.1–0.2 mm long. **Pinnae** 2–10 × 1–2(–2.5) cm, incised 1/3 their width or less, sometimes merely shallowly crenate, often auricled at acroscopic base, proximal 1–3 pairs deflexed and slightly shortened. **Segments** mostly 3–5 mm wide, rounded or truncate at tip. **Veins** mostly 3–7(–11) pairs per segment, mostly simple, proximal 1–2(–2 1/2) pairs from adjacent segments connivent at or below sinus with an excurrent vein to sinus. **Indument** abaxially on costae and veins of moderately dense to dense, spreading, acicular trichomes 0.1–1 mm, also with furcate and stellate trichomes on costae, laminar tissue commonly with acicular trichomes 0.1–0.2 mm or minute glands, veins and laminar tissue adaxially with rather dense appressed trichomes 0.2–0.4 mm. **Sori** medial, indusia reddish brown, densely setose along margin; sporangia glabrous or with setae on sporangial stalks.

Along streams or in shaded ravines, terrestrial, in rock crevices, or epipetric, lowland and montane rain forests, 200–1300 m, San Martín, Huá-

nuco, Pasco, Junín, Ucayali, Ayacucho, Cuzco, and Madre de Dios.

Ecuador to Bolivia, southern Brazil.

A specimen from Pasco (*Smith 2900*, F, MO) is atypical in having pinnae incised nearly half their width and in the presence of buds in axils of distal pinnae. It was collected at higher elevation (1850 m) than all other specimens.

San Martín: Prope Tarapoto, *Spruce 3946* (G, GH, K, P, syntypes of *Nephrodium jamesonii*). San Martín, 5–15 km E of Shapaja on road to Chazuta, *Knapp & Mallet 7023* (F, MO). **Huánuco:** Along Río Monzón near Río Huallaga at Tingo María, *Croat 21203* (MO, UC). **Pasco:** Prov. Oxapampa, 5 km SE of Oxapampa, *D. Smith 2900* (F, MO, USM). **Junín:** La Merced, *Killip & Smith 23728* (GH). **Ucayali:** Prov. Coronel Portillo, Km 328, camino a Pucallpa, *Ridoutt* (GH). **Ayacucho:** Ayna, between Huanta and Río Apurímac, *Killip & Smith 22725* (F). **Cuzco:** La Convención, Potrero, 8 km W of Quillabamba, *Tryon & Tryon 5379* (F, GH, US, USM). **Madre de Dios:** Prov. Manú, Atalaya, vicinity of Hda. Amazonia, 2–3 km W of village, *Foster & Wachter 7444* (MO, USM).

66. *Thelypteris macrotis* (Hooker) R. Tryon, *Rhodora* 69: 7. 1967.

Nephrodium macrotis Hooker, Sp. fil. 4: 86, t. 242B. 1862. TYPE: Peru, Tarapoto, *Spruce 3979* (holotype, K; isotypes, A!, BM!, GH!, L, P, UC!). *Dryopteris macrotis* (Hooker) Kuntze, Rev. gen. pl. 2: 813. 1891.

Stem suberect to erect, caudex 0.8–2 cm in diameter, scales light brown, dull, ovate-lanceolate, glabrous or with simple trichomes 0.1–0.2 mm. **Leaves** several, clustered, 25–105 cm long, usually somewhat dimorphic with fertile longer-petioled and with contracted pinnae. **Petiole** 15–60 cm × 1.5–4.5 mm, tan to brown, glabrescent or with acicular trichomes. **Lamina** herbaceous, not verrucose, 1-pinnate, with a confluent, pinnatifid apex. **Buds** and sometimes plantlets often present in axils of distal pinnae. **Rachis** with stiff, acicular trichomes 0.3–1.5 mm, lacking furcate or stellate ones. **Pinnae** 3.5–15 × 0.7–1.6(–2) cm, subentire, crenate, or very shallowly incised 1/2 their width or less, with a narrow-triangular auricle to 1 cm long at acroscopic base, proximal 2–4 pairs strongly reflexed and slightly shortened, often with pinnae to middle of blade reflexed and curved upward at tip. **Crenations** mostly 3–4 mm wide, rounded or truncate. **Veins** 3–7 pairs per vein group, mostly simple, proximal 1–2 pairs from adjacent segments connivent at sinus or lowermost united below sinus with an excurrent vein to sinus. **Indu-**

ment abaxially on costae and veins of moderately dense to dense, spreading, acicular trichomes 0.2–1.5 mm, furcate and stellate trichomes completely lacking, laminar tissue commonly with acicular trichomes 0.2–0.3 mm, these sometimes adpressed, veins and laminar tissue adaxially usually with rather dense adpressed trichomes 0.2–0.4 mm. **Sori** medial, indusia reddish brown, densely setose; sporangia glabrous or often with setae on sporangial stalks.

Along streams and shaded cliffs in wet tropical and montane forests, 180–1000 m, Amazonas, San Martín, Loreto, Huánuco, Junín, and Madre de Dios.

Endemic to Peru.

This is one of the few species of subg. *Goniopteris* that completely lacks stellate or furcate trichomes. Apparently, the lack of such trichomes is derived in this species. As suggested by the adpressed adaxial pubescence and similar blade dissection, *T. macrotis* is closely allied to, and possibly derived from *T. jamesonii*, which has branched trichomes. Pinnae of *T. macrotis* are more shallowly incised, more reflexed, and with more pronounced auricles than in *T. jamesonii*.

Amazonas: Prov. Bagua, bank of Río Marañón above Cascadas de Mayasi, *Wurdack 1973* (F, GH, UC, USM). **San Martín:** Prov. Mariscal Cáceres, Dist. Campanilla, Cachiñuñushca, Río Huallaga, *Schunke V. 4284* (F). **Loreto:** Pongo de Manseriche, *Mexia 6383* (BH, F, GH, MO, UC, USM). **Huánuco:** Prov. Pachitea, Dist. Honoria, 1 km arriba del pueblo de Tournavista, *Schunke 1250* (F, GH). **Junín:** Hacienda Perene, *Coronado 238, 248* (GH, UC). **Madre de Dios:** Parque Nacional del Manú, Cocha Cachu Biological Station, *M. Foster P-84-69* (UC).

67. *Thelypteris semihastata* (Kunze) Ching, Bull. Fan Mem. Inst. Biol., Bot. 10: 254. 1941.

Aspidium semihastatum Kunze, Linnaea 9: 91. 1834. TYPE: Peru, (Huánuco), ad flum. Pampayacu, *Poeppig* (holotype, LZ, destroyed; drawing of type, B; possible isotype, MO!). *Lastrea poeppigiana* Presl, Epim. bot. 40. 1849. TYPE: Peru [erroneously, "Cuba"], *Poeppig* (holotype, presumably PR). *Dryopteris semihastata* (Kunze) Kuntze, Rev. gen. pl. 2: 291. 1891.

Stem short-creeping to suberect, ca. 5 mm in diameter, scales light brown, dull, ovate-lanceolate, with simple trichomes 0.1–0.2 mm. **Leaves** numerous, up to ca. 40 cm long, monomorphic. **Petiole** ca. 5 cm × 1 mm, tan, glabrescent or with

acicular trichomes. **Lamina** herbaceous, not verrucose, 1-pinnate with a confluent, pinnatifid apex. **Bud** sometimes present in axils of distal pinnae. **Rachis** with stiff, acicular trichomes 0.3–1.5 mm, lacking furcate or stellate ones. **Pinnae** 2–4 × 0.6–1 cm, crenate or incised up to ½ their width or less, with a slightly enlarged triangular auricle to 5 mm long at acroscopic base, proximal 3–6 pairs reflexed and slightly shortened, sometimes curved upward at tip. **Crenations** mostly 2–2.5 mm wide, rounded. **Veins** 2–4 pairs per vein group, simple, proximal pair from adjacent segments connivent at or running towards sinus. **Indument** abaxially on costae and veins of moderately dense to dense, spreading, acicular trichomes 0.2–1.5 mm, furcate and stellate trichomes completely lacking, laminar tissue commonly with acicular trichomes 0.2–0.3 mm, veins and laminar tissue adaxially usually with rather dense adpressed trichomes mostly 0.2–0.5 mm. **Sori** medial, indusia reddish brown, densely setose; sporangia glabrous or often with setae on sporangial stalks.

Lower montane rain forest, 670 m, Huánuco. Endemic to Peru.

This is closely related to *T. macrotis* and differs by the narrower blades, shorter petioles, and gradually reduced proximal pinnae. It also completely lacks stellate trichomes.

Huánuco: Río Bella, 7 km de Tingo María, *Soukup* 3091 (F, MO).

68. **Thelypteris abrupta** (Desv.) Proctor, *Rhodora* 61: 306. 1959 [1960].

Polypodium abruptum Desv., *Mém. Soc. Linn. Paris* 6: 239. 1827. TYPE: Antilles, collector not stated (holotype, ♀, *Herb. Desvaux*).

Goniopteris pyramidata Fée, *Mém. Fam. Foug.* 11: 61, t. 16, f. 2. 1866. TYPE: Guadeloupe, *L'Hermínier* (holotype, ♀; isotypes, B, ♀).

Dryopteris pyramidata (Fée) Maxon, *Contr. U.S. Natl. Herb.* 10: 489. 1908.

Stem short-creeping to suberect, 5–7 mm in diameter, or caudex up to 1.5 cm in diameter, scales light brown, dull, ovate-lanceolate, with stellate and furcate trichomes 0.1 mm. **Leaves** few, clustered or not, 45–90 cm long, monomorphic or slightly dimorphic with fertile longer-petioled and with slightly contracted pinnae. **Petiole** 20–50 cm × 1.5–4 mm, tan to brown, glabrescent or with acicular and stellate trichomes 0.1 mm. **Lamina** herbaceous, not verrucose, 1-pinnate-pinnatifid

and with a confluent, pinnatifid apex. **Bud** often present in axil of distal pinna. **Rachis** with a mixture of acicular trichomes 0.1–0.3 mm and furcate or stellate ones 0.1 mm. **Pinnae** 5–10(–12) pairs, often short-stalked to 3 mm, 8–15 × 1.5–3 cm, incised ⅓–½ their width, proximal ones narrowed at the base and lacking auricles, lowermost spreading or slightly deflexed. **Segments** mostly 3.5–7 mm wide, rounded or truncate at tip. **Veins** mostly 6–13 pairs per segment, simple, proximal pair from adjacent segments connivent at or just below the sinus (and then at an acute angle), rarely the lowermost pair united at an obtuse angle with an excurrent vein. **Indument** abaxially on costae and veins of sparse to moderately dense, acicular trichomes mostly ca. 0.1–0.2(–0.3) mm, sometimes also with furcate trichomes at base of costae, laminar tissue glabrous, veins and laminar tissue glabrous adaxially. **Sori** medial, indusia brownish, setose; sporangia glabrous or with setae on sporangial stalks.

Lowland rain forests, 100–400 m, Loreto, Huánuco, Ucayali, Cuzco, and Madre de Dios.

Hispaniola; Lesser Antilles; Trinidad and Tobago; Guianas; Amazonian Brazil; Ecuador to Bolivia.

Schunke 2686 differs in lacking a bud in the axil of a distal pinna, having fewer (5 or 6) pinna pairs, and in having the lowermost pair of veins united below the sinus with an excurrent vein to 5 mm.

Loreto: Prov. Maynas, Dtto. Alto Nanay, near Santa María de Nanay, *Simpson & Schunke* 725 (F, GH). Prov. Maynas, Yanamono Explorama Tourist Camp, halfway between Indiana and mouth of Río Napo, *van der Werff et al.* 9864 (MO), 9963 (MO, UC). Lower Río Huallaga, Puerto Arturo, Yurimaguas, *Ll. Williams* 5029 (F). **Huánuco:** Prov. Pachitea, Dist. Honoria, Bosque Nacional de Iparia, Río Pachitea, *Schunke* V. 1375 (F, in part; this no. also *T. tristis*). **Ucayali:** Prov. Coronel Portillo, Dist. Iparia, Quebrada de Tabacoa, Río Ucayali, *Schunke* 2686 (F, GH). Prov. Coronel Portillo, Dist. Calleria, Bosque Nacional Alexander von Humboldt, (as Loreto), *Schunke* V. 10411 (MO, UC). **Cuzco:** Prov. Paucartambo, Atalaya-Carbón, *Vargas* 13429 (GH). **Madre de Dios:** Prov. Tambopata, ca. 30 km SSW of Puerto Maldonado, *Barbour* 4997 (MO, UC), 5141 (F, MO, UC, USM), 5315 (F, MO, USM), 5721 (MO, UC). Tambopata, Albergue, “Cuzco Amazonica,” *León* 885 (F, USM).

69. **Thelypteris lugubriformis** (Rosenst.) R. Tryon, *Rhodora* 69: 7. 1967.

Dryopteris lugubriformis Rosenst., *Repert. Spec. Nov. Regni Veg.* 7: 299. 1909. TYPE: Peru, [San Mar-

tin], Tarapoto, *Spruce 4749* (holotype, p!; frag., us).

Stem short-creeping, 0.8–1.5 cm in diameter, or suberect with caudex up to 2.5 cm in diameter, scales not seen. **Leaves** few, 90–120 cm long, monomorphic. **Petiole** 40–60 cm × 3–7 mm, tan to brown, with dense stellate trichomes 0.1–0.2 mm or glabrescent. **Lamina** thick-herbaceous to subcoriaceous, not verrucose, 1-pinnate-pinnatifid with a confluent, pinnatifid apex or the apex subhastate and more or less similar to the lateral pinnae. **Bud** usually present in axil of distal pinna. **Rachis** with a mixture of stout, acicular trichomes to 1.5 mm and more numerous furcate or stellate ones 0.1–0.3 mm. **Pinnae** 11–15 pairs, sessile or stalked to 3 mm, 12–16 × 2.5–3.5 cm, incised $\frac{1}{2}$ – $\frac{1}{3}$ their width, lowermost slightly narrowed at the base and lacking auricles, spreading or slightly deflexed. **Segments** mostly 4–6 mm wide, rounded or truncate at tip. **Aerophores** peglike, to 0.5 mm long at pinna bases. **Veins** mostly 12–18 pairs per segment, simple, proximal pair from adjacent segments connivent at or just below the sinus, the next 1–2 pairs running to sinus. **Indument** abaxially on costae, veins, and laminar tissue of numerous acicular trichomes mostly 0.2–1.5 mm, the costae also with furcate trichomes 0.1–0.2 mm, laminar tissue adaxially with numerous adpressed trichomes 0.2–0.4 mm. **Sori** inframedial to medial, indusia brownish, densely setose; sporangia with setae on sporangial stalks.

Lowland rain forests, 100–800 m, San Martín, Loreto, Pasco, Cuzco, and Madre de Dios.
Colombia to Bolivia.

Loreto: Ca. 50 mi downriver from Iquitos on Amazon River at Peter Jensen's Explorama lodge, *Moran 3650* (MO, UC, USM). Yanomono, Explorama Tourist Camp, Río Amazonas, *Gentry et al. 36667* (MO, USM). Soledad, on Río Itaya, *Killip & Smith 29559* (NY). **Pasco:** Puerto Bermúdez, *Killip & Smith 26649* (NY). **Cuzco:** Prov. La Convención, from Hda. Luisiana and Apurímac River via camp trail through Polies Carpo's property, *Dudley 11568* (GH). **Madre de Dios:** Prov. Manú, Manú Park, Cocha Cashu uplands, *Núñez 6116* (MO).

70. *Thelypteris eggersii* (Hieron.) Reed, *Phytologia* 17: 274. 1968.

Nephrodium eggersii Hieron., *Bot. Jahrb. Syst.* 34: 441. 1904. TYPE: Ecuador, El Recreo, *Eggers 15319* (holotype, B; photo, us).

Dryopteris eggersii (Hieron.) C. Chr., *Index fil.* 263. 1905.

Goniopteris eggersii (Hieron.) Alston, *Bull. Jard. Bot. Etat* 27: 57. 1957.

Stem suberect to erect, caudex 1.5–3 cm in diameter, scales light brown, appressed, tan, densely stellate-pubescent. **Leaves** few, (50–)80–120(–160) cm long, monomorphic. **Petiole** (20–)35–60 cm × 3–5 mm, brownish, with dense, stellate trichomes 0.1 mm. **Lamina** chartaceous, not verrucose, 1-pinnate-pinnatifid, the apex confluent and pinnatifid. **Bud** usually present in axil of distal pinna. **Rachis** with dense, mostly stellate trichomes ca. 0.1–0.15 mm. **Pinnae** 15–20 pairs, sessile or stalked to 2 mm, mostly 10–16 × 1.5–2.5 cm, incised $\frac{2}{3}$ – $\frac{3}{4}$ (– $\frac{4}{5}$) their width, lowermost spreading, narrowed at the base with several pairs of reduced segments, auricles lacking. **Segments** mostly 3–5 mm wide, truncate to acutish at tip. **Veins** mostly 9–12 pairs per segment, proximal pair from adjacent segments connivent or at running to sinus. **Indument** abaxially on costae of very dense, simple, furcate, and stellate trichomes 0.1–0.3 mm, veins and laminar tissue with acicular trichomes 0.1–0.4 mm, veins and laminar tissue adaxially glabrous or with sparse trichomes toward margin. **Sori** medial, indusia large, to 1 mm in diameter, reddish brown, densely setose; sporangia glabrous or with setae on sporangial stalks.

Montane rain forests, 1000 m, Junín.

Costa Rica to Panama; Colombia to Peru.

Among Peruvian *Thelypteris*, this is most similar to *T. biformata* and differs by the very dense, rather uniformly short stellate pubescence on the costae abaxially. In addition, the lamina is more gradually tapering distally, never abruptly reduced, and the number of lateral pinna pairs is larger. Peruvian material differs from that of Central America in the longer and more numerous unbranched trichomes on costae and veins abaxially.

Junín: Chanchamayo valley, *C. Schunke 56, 80, 84, 85* (all F).

71. *Thelypteris erythrotrix* A. R. Sm., *sp. nov.*

A speciebus ceteris subg. *Goniopteridis* distinguenda laminae apice confluyente pinnatifido, trichomatibus atrorubris stellatis furcatis acicularibusque 0.1–0.5 mm longis ad rhachim et costas abaxialiter dispositis, lamina glabra adaxialiter, soris exindusiatis.

Stem suberect, caudex ca. 1 cm in diameter,

scales brown, glabrous or with a few stellate trichomes 0.1 mm. **Leaves** few, 45–60 cm long, monomorphic. **Petiole** 15–30 cm × 2 mm, tan, glabrescent or with sparse stellate trichomes 0.1 mm. **Lamina** chartaceous, not verrucose, 1-pinnate-pinnatifid, the apex confluent and pinnatifid. **Bud** lacking in axil of distal pinna. **Rachis** abaxially with moderate, red, mostly furcate and stellate trichomes ca. 0.15–0.5 mm, adaxially the unbranched trichomes deep red, more numerous, up to 1 mm. **Pinnae** 10–12 pairs, sessile or stalked to 1 mm, mostly 6–9 × 1.6–2.2 cm, incised ca. ½ their width, lowermost spreading or slightly deflexed, with 1–2 pairs of reduced segments, auricles lacking. **Segments** mostly 3–4 mm wide, truncate to acute at tip. **Veins** mostly 8–11 pairs per segment, proximal pair (or 1½ pairs) from adjacent segments connivent at or just below sinus. **Indument** abaxially on costae and costules of sparse to moderately dense, hyaline to often red, furcate and stellate trichomes 0.2–0.5 mm, veins and laminar tissue glabrous or with sparse hyaline acicular trichomes 0.1–0.2 mm, adaxially with veins and laminar tissue glabrous. **Sori** inframedial to medial, indusia lacking; sporangia glabrous.

TYPE—Peru, Amazonas, Prov. Bagua, Cordillera Colán SE of La Peca, Third camp, *Barbour 3894* (holotype, MO!).

Epiphytic on tree bole and on rocky outcropping, 2100–2400 m, Amazonas, known only from the type.

The deep red, stellate, furcate, and simple trichomes on both sides of the rachis suggest that this is related to *T. curta* (Christ) Reed (Costa Rica to Ecuador and Venezuela), *T. killipii* A. R. Sm. & Lellinger (Colombia and Ecuador), and *T. peripae* (Sodiño) Reed (Ecuador and Colombia); *T. biformata* may also be related. From all of these species, *T. erythrothrix* differs in the absence of indusia, sparser pubescence on rachis, costae, and lamina adaxially, and glabrous lamina adaxially. The elevation is unusually high for any species of subg. *Goniopteris*.

72. ***Thelypteris biformata*** (Rosenst.) R. Tryon, *Rhodora* 69: 5. 1967.

Dryopteris biformata Rosenst., Repert. Spec. Nov. Regni Veg. 7: 300. 1909. **TYPE**: Peru, (San Martín), near Tarapoto, ad rivulum Cachi-yacu, *Spruce 4037* (holotype, P!; isotypes, BM!, K!, frag., US!).

Stem suberect to erect, caudex up to 10 cm long,

1–3 cm in diameter, scales dark brown or brown, densely stellate-pubescent. **Leaves** few, mostly 50–100(–125) cm long, monomorphic or often subdimorphic with fertile ones longer-petioled and with contracted pinnae. **Petiole** 25–60 cm × 3–6 mm, tan to brownish, with dense, stellate trichomes 0.1 mm. **Lamina** herbaceous, not verrucose, 1-pinnate-pinnatifid, the apex abruptly reduced and pinnalike, confluent with proximal pinnae or often more or less free. **Bud** usually present in axil of distal pinna. **Rachis** with dense, stellate trichomes ca. 0.1–0.3 mm and longer hyaline to often red acicular ones to 1.5 mm. **Pinnae** 9–16 pairs, sessile or stalked up to 5 mm, mostly 8–20 × 1.6–4 cm, incised ⅔–⅘ their width, lowermost spreading, narrowed at the base with several pairs of reduced segments, auricles lacking. **Segments** mostly 3–6 mm wide, rounded to acutish at tip. **Veins** 10–22 pairs per segment, proximal 1–2 pairs from adjacent segments connivent at or running to sinus. **Indument** abaxially on costae of dense acicular trichomes to 1.5 mm and more numerous short acicular, furcate, and stellate ones 0.1–0.2 mm, veins and laminar tissue glabrous or with acicular trichomes 0.1–0.5 mm, veins and laminar tissue adaxially glabrous or with sparse trichomes toward margin. **Sori** medial, indusia reddish brown, setose; sporangia glabrous.

Lowland and occasionally montane rain forests, 100–1700 m, Amazonas, San Martín, Loreto, Pasco, and Junín.

Ecuador; Peru; Amazonian Brazil.

This is a common and rather variable species in Peru, and it probably hybridizes with other species, e.g., *T. tristis*.

Amazonas: Prov. Bagua, along Quebrada Tambillo, valley of Río Marañón above Cascadas de Mayasi, *Wurdack 1988* (GH, US, USM). **Loreto**: Balsapuerto, lower Río Huallaga basin, *Killip & Smith 28532* (NY). Mishuyacu, near Iquitos, *Klug 312* (F, NY). Prov. Maynas, Dist. Iquitos, Río Momon, Puesto San Miguel, *McDaniel 17316* (F, GH, MO, USM). Gamitanacocho, Río Mazán, *Schunke 15* (F, GH, NY, UC). Prov. Maynas, Yanamono, Explorama Tourist Camp on Río Amazonas between Indiana and mouth of Río Napo, *Gentry et al. 29125* (F, MO, UC), *36667* (UC). **Pasco**: Pichis Trail, Yapas, (as Junín), *Killip & Smith 25533* (NY). **Junín**: Schunke Hacienda, above San Ramón, *Killip & Smith 24724* (NY). Cahuapanas, on Río Pichis, *Killip & Smith 26785* (NY).

73. ***Thelypteris tristis*** (Kunze) R. Tryon, *Rhodora* 69: 8. 1967.

Polypodium triste Kunze, *Linnaea* 9: 47. 1834. **TYPE**:

Peru, Huallaga ad Mission Tocache, *Poeppig* (holotype, LZ, destroyed; presumed isotypes, B, K!). *Dryopteris tristis* (Kunze) Kuntze, Rev. gen. pl. 2: 814. 1891.

Goniopteris tristis (Kunze) Brade, Bradea 1: 217. 1972.

Stem short-creeping, to 1 cm in diameter, scales brown, somewhat shining, with furcate or stellate trichomes 0.1 mm. **Leaves** few, mostly 60–175 cm long, monomorphic or very slightly dimorphic with fertile ones longer-petioled and with slightly contracted pinnae. **Petiole** 20–90 cm × 3–7 mm, tan to brownish, glabrous or with sparse stellate trichomes 0.1 mm. **Lamina** chartaceous, not verrucose, 1-pinnate-pinnatifid, the apex abruptly reduced and pinnalike, more or less free. **Bud** usually present in axil of distal pinna. **Rachis** glabrous or with stellate trichomes 0.1–0.2 mm, sometimes also with longer acicular ones to 1.5 mm. **Pinnae** 5–16 pairs, sessile or stalked up to 5 mm, mostly 15–25(–35) × 2–4(–6) cm, incised $\frac{1}{2}$ – $\frac{3}{4}$ their width, lowermost spreading or slightly ascending, narrowed at the base with several pairs of reduced segments and often a cuneate wing, auricles lacking. **Segments** mostly 4–8 mm wide, often subfalcate, rounded to acutish at tip. **Veins** 9–22 pairs per segment, proximal 2–3 pairs from adjacent segments connivent at or running to sinus. **Indument** abaxially on costae lacking or of sparse to moderately dense acicular trichomes 0.1–1.5 mm and fewer furcate and stellate ones 0.1–0.2 mm, veins glabrous or sometimes with acicular trichomes, laminar tissue glabrous, veins and laminar tissue glabrous adaxially or the veins occasionally with scattered trichomes. **Sori** inframedial to medial, often confluent at maturity, indusia small to medium-sized, apparently lacking in a few specimens, brownish, usually with trichomes 0.1–0.5 mm; sporangia glabrous.

Lowland and lower montane rain forests, 100–500(–1200) m, Amazonas, San Martín, Loreto, Huánuco, Ucayali, Ayacucho, Cuzco, and Madre de Dios.

Panama; Colombia to French Guiana and Bolivia; Amazonian Brazil.

This is the most common member of subg. *Goniopteris* in Peru, with over 45 collections seen. It is extremely variable in pubescence (glabrous or with short to very long trichomes greater than 1 mm), size of indusia (minute to moderately sized, seemingly absent in a few specimens), and presence or absence of buds in the axils of distal pinnae. Probably, *T. tristis* hybridizes with several other species.

Amazonas: Prov. Bagua, Río Utcumbamba on Cerro Tapur, above Hda. Misqui, ca. 40 km S of Bagua Grande, *Hutchison 1487* (GH, UC). **San Martín:** San Martín, 5–10 km NE of Shapaja on road to Cazuta, along Río Huallaga, *Knapp & Mallet 6918* (F, MO). **Loreto:** Above Pongo de Manseriche, mouth of Río Santiago, *Mexia 6111* (BH, F, G, GB, GH, MO, NY, UC, Z). **Huánuco:** Dist. Honoria, Bosque Nacional de Iparia, a lo largo del Río Pachitea cerca del campamento Miel de Abeja, *Schunke V. 1375* (F, GH). **Ucayali:** Bosque Nacional von Humboldt, Km 88, Pucallpa–Tingo María road, *Gentry et al. 36384* (MO, UC). **Ayacucho:** Río Apurímac Valley, near Kimpitiriki, *Killip & Smith 22904* (NY). **Cuzco:** Prov. La Convención, Río Apurímac, below San Martín, *Davis et al. 1323* (GH). **Madre de Dios:** Prov. Tambopata, Puerto Arturo, *Vargas 18773* (GH).

74. *Thelypteris juruensis* (C. Chr.) R. Tryon & Conant, Acta Amazonica 5: 33. 1975.

Dryopteris juruensis C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 10: 256. 1913. TYPE: Brazil, Amazonas, bei Bom Fim, Río Juruá, *Ule 5325* (holotype, B; isotype, P). *Goniopteris juruensis* (C. Chr.) Brade, Bradea 1: 216. 1972.

Stem short-creeping to suberect, caudex 0.8–2 cm in diameter, scales brown, with numerous stellate trichomes 0.1 mm. **Leaves** few, mostly 25–80 cm long, monomorphic or very slightly dimorphic with fertile ones longer-petioled. **Petiole** 12–45 cm × 1.5–4 mm, tan to brownish, glabrous or with sparse stellate trichomes 0.1 mm. **Lamina** chartaceous, verrucose, 1-pinnate-pinnatifid, the apex abruptly reduced and pinnalike, more or less free. **Bud(s)** usually present in axil(s) of distal pinna(e). **Rachis** glabrous or with sparse to moderately dense furcate and stellate trichomes 0.1 mm. **Pinnae** mostly 3–7 pairs, sessile or stalked up to 3 mm, mostly 8–16 × 2–3 cm, crenate to incised up to $\frac{1}{2}$ their width, all narrowed at the base with several pairs of reduced segments, auricles lacking, lowermost spreading or slightly ascending. **Segments** mostly 4–6 mm wide, rounded to truncate at tip. **Veins** mostly 6–12 pairs per segment, proximal 2–3 pairs from adjacent segments connivent at or just below sinus or running to sinus, distal vein of proximal pair arising from costa. **Indument** abaxially on costae lacking or of sparse acicular trichomes 0.1 mm, occasionally with a few stellate or furcate trichomes 0.1 mm, veins and laminar tissue glabrous on both sides. **Sori** inframedial, indusia small or apparently lacking, brownish, glabrous or with trichomes 0.1 mm; sporangia glabrous.

Lowland rain forests, 100–350 m, Loreto and Madre de Dios.

Ecuador; Peru; Bolivia; Amazonian Brazil; French Guiana.

This is one of the most commonly collected ferns in Loreto and Madre de Dios, with 25 collections seen, but apparently rare or uncollected elsewhere in Peru. Two collections from Ecuador, where it was unknown until recently (Smith, 1983), are *Lawesson et al.* 43361 (AAU) and *Foster* 3800 (US).

Loreto: Near mouth of Río Napo, *Croat* 20209 (F, MO, UC, USM). Yurimaguas, lower Río Huallaga, *Killip & Smith* 27665, 27697 (NY). **Madre de Dios:** Prov. Tambopata, ca. 30 air km SSW of Puerto Maldonado, Tambopata Nature Reserve, *Barbour* 5130 (F, MO, UC, USM). Parque Nacional del Manú, Cocha Cashu Biological Station, *M. Foster* P-84-59 (UC), P-84-71 (MO).

75. *Thelypteris tryonorum* A. R. Sm., *sp. nov.*

A speciebus ceteris subg. *Goniopteridis* distinguenda laminae apice libero pinnaeformi, pinnis lateralibus vulgo 5–9-jugis incisus ad plus minusve tertiam partem latitudinis basi angustatis, gemmis vel plantulis ex pinnae distalium axillis ortis, 3–6-paribus venarum ex segmentis contiguas ad sinum vel sub sinu conniventibus, trichomatibus plerumque acicularibus simplicibus vel nonnullis furcatis, 0.1–0.2 mm ad costas abaxialiter dispositis, soris exindusiatis.

Stem suberect to erect, caudex 1–2 cm in diameter, scales brown, with sparse stellate trichomes 0.1 mm. **Leaves** few, mostly 75–100 cm long, monomorphic or slightly dimorphic with fertile ones longer-petioled and with slightly narrowed pinnae. **Petiole** 35–55 cm × 3–5 mm, tan to brownish, glabrescent or with sparse to moderate stellate trichomes 0.1 mm. **Lamina** chartaceous to subcoriaceous, not verrucose, 1-pinnate-pinnatifid, the apex abruptly reduced and pinnalike, free. **Bud(s)** and sometimes plantlets usually present in axil(s) of distal pinna(e). **Rachis** with moderately to dense furcate and stellate trichomes 0.1–0.2 mm. **Pinnae** mostly 5–9 pairs, stalked up to 5 mm, mostly 12–20 × 3–4.5 cm, incised ca. 1/3 their width, all narrowed at the base with several pairs of reduced segments, auricles lacking, lowermost spreading or slightly ascending. **Segments** mostly 5–7 mm wide, truncate to acute at the subfalcate tip. **Veins** mostly 12–18 pairs per segment, proximal 3–6 pairs from adjacent segments connivent at or below sinus, distal vein of proximal pair arising from costa. **Indument** abaxially on costae, costules, and sometimes veins of moderately dense to dense acicular and a few

furcate trichomes 0.1–0.2 mm, also with light brown linear to lanceolate scales to 2 mm, laminar tissue glabrous, veins and laminar tissue adaxially glabrous. **Sori** inframedial, indusia lacking; sporangia glabrous.

TYPE—Peru, Huánuco, Tingo María, *Tryon & Tryon* 5248 (holotype, GH!; isotype, F!, USM!).

Hillsides and rocky slopes in wet montane forests, 600–1500 m, Huánuco, Pasco, and Junín.

Known only from Peru.

Huánuco: Fundo Chela, *Aguilar* 936 (GH). Tingo María, Cueva de las Pavas, *Aldave & Fernández* 5573 (GH). 60° slope at Río Huallaga at Tingo María, *Croat* 21049 (MO), 21064 (MO, UC). Tingo María to Pucallpa, *Ellenberg* 3830 (GH). **Pasco:** Prov. Oxapampa, Valle del Palcazú, Río Cacaquí, Cacaquí, *León* 685 (F, USM). **Junín:** La Merced, *Killip & Smith* 23717 (NY). Chanchamayo Valley, *C. Schunke* 141 (F). La Merced, Chanchamayo, *Schunke* (*Rosenst. exs.* 29) (P). La Merced–Chanchamayo, *Soukup* 1049 (F).

76. *Thelypteris biolleyi* (Christ) Proctor, Bull. Inst. Jamaica, Sci. Ser. 5: 58. 1953. **Figure 6.**

Nephrodium nemorale Sodiro, Crypt. vasc. Quit. 267. 1893. **TYPE:** Ecuador, cerca de San Miguel de los Colorados, *Sodiro* (possible type material, P; photo, us; frag., us!).

Aspidium biolleyi Christ in Pittier, Prim. fl. costaric. 3: 31. 1901. **TYPE:** Costa Rica, Tuis, près Turrialba, *Pittier* 11243 (holotype, P!; isotype, us!).

Dryopteris asterothrix Rosenst., Repert. Spec. Nov. Regni Veg. 7: 305. 1909. **TYPE:** Peru, (San Martín), secus rivulum Cachi-yacu, *Spruce* 4659 (holotype, P; isotypes, w!; frag., us).

Thelypteris nemoralis (Sodiro) R. Tryon, Rhodora 69: 7. 1967 (not Ching, 1936).

Thelypteris sodiroi Reed, Phytologia 17: 314. 1968. A *nom. nov.* for *T. nemoralis* (Sodiro) R. Tryon.

Goniopteris biolleyi (Christ) Pic.-Ser., Webbia 31: 251. 1977.

Stem short-creeping to erect, caudex 2–3 cm in diameter, scales brownish, with numerous stellate trichomes 0.1 mm. **Leaves** few, 75–175 cm long, monomorphic. **Petiole** 40–70 cm × 3–5 mm, tan to brownish, glabrescent or with stellate trichomes 0.1 mm. **Lamina** herbaceous, often verrucose, 1-pinnate-pinnatifid, the apex gradually reduced, pinnatifid, confluent. **Bud** absent in axil of distal pinna. **Rachis** with moderately dense to often dense, stellate trichomes 0.1–0.2 mm. **Pinnae** mostly 20–30 pairs, sessile or stalked to 1 mm, mostly 12–22 × 1.8–3 cm, incised ca. 1/2–2/3 their width, lowermost spreading or slightly ascending, narrowed at the base with several pairs of reduced

segments, sometimes with a cuneate wing, auricles lacking. **Segments** mostly 4–6 mm wide, rounded to truncate at tip. **Veins** mostly 12–15 pairs per segment, proximal pair from adjacent segments usually uniting below sinus at 45–90° with an excurrent vein to sinus, next 1–2 pairs running to sinus. **Indument** abaxially on costae, costules, veins, and laminar tissue of moderately dense to dense stellate trichomes mostly 0.1 mm, adaxially the veins and laminar tissue with appressed, stellate trichomes 0.1 mm and fewer acicular ones to 0.8 mm on veins. **Sori** inframedial, exindusiate or with a minute indusium; sporangia glabrous or with a few stellate trichomes 0.1 mm.

Lowland and montane rain forests, 200–1500 m, San Martín, Loreto, and Junín.

Jamaica; southern Mexico; Guatemala to Panama; Colombia to Peru, Venezuela; Brazil.

In most other parts of the range this species has anchor-shaped trichomes on the abaxial costae and sometimes on the lamina tissue; such trichomes are lacking in Peruvian specimens.

San Martín: Prope Tarapoto, *Spruce 4659* (w). **Loreto:** Above Pongo de Manseriche, mouth of Río Santiago, *Mexia 6114* (BH, F, GB, GH, MO, NY, UC). **Junín:** Prov. Tarma, E tributary of Río Tullumayo along path to settlement “Tirol,” ca. 3 km SE of San Ramón, *Ilitis & Ilitis 248* (GH). Chanchamayo valley, *C. Schunke 818* (F).

77. ***Thelypteris ancyrlothrix*** (Rosenst.) A. R. Sm., Fl. Ecuador 18: 140. 1983.

Dryopteris ancyrlothrix Rosenst., Repert. Spec. Nov. Regni Veg. 7: 305. 1909. TYPE: Peru, (San Martín), in monte Guayrapurima, *Spruce 4748* (holotype, ♀; 2 pinnae from type, us!).

Stem suberect, scales brownish, with numerous stellate trichomes 0.1 mm. **Leaves** few, 100–150 cm long, monomorphic. **Petiole** 50–75 cm × 3–5 mm, stramineous to tan, with anchor-shaped and acicular trichomes to 0.5 mm. **Lamina** herbaceous, often verrucose, 1-pinnate-pinnatifid, the apex gradually reduced, pinnatifid, confluent. **Bud** absent in axil of distal pinna. **Rachis** with moderately dense to often dense anchor-shaped trichomes to 0.5 mm. **Pinnae** sessile or short-stalked, 15–20 × 2–3 cm, incised ca. ¾ their width, lowermost spreading or slightly ascending, narrowed at the base with several pairs of reduced segments tapering to a long-cuneate wing, auricles lacking. **Segments** mostly 4–6 mm wide, rounded to trun-

cate at tip. **Veins** mostly 10–16 pairs per segment, proximal pair from adjacent segments connivent at sinus or uniting below sinus at an obtuse angle with an excurrent vein to sinus, next pair running to sinus. **Indument** abaxially on costae, costules, veins, and laminar tissue of moderately dense to dense anchor-shaped trichomes mostly 0.3–0.6 mm, also with a few longer acicular trichomes, veins and laminar tissue adaxially with scattered to numerous appressed, stellate trichomes 0.1 mm. **Sori** medial, exindusiate; sporangia glabrous.

Lowland rain forests, swampy sites, 130–260 m, San Martín, Loreto, and Madre de Dios. Ecuador and Peru.

San Martín: Mt. Guayrapurima, *Spruce 4748* (p, us). **Loreto:** Prov. Maynas, Yanamono Explorama Tourist Camp, halfway between Indiana and mouth of Río Napo, *van der Werff et al. 9908* (MO, UC). **Madre de Dios:** Prov. Tambopata, ca. 30 km or 70–80 river km SSW of Puerto Maldonado at effluence of Río La Torre (Río D’Orbigny)/Río Tambopata, *Barbour 5326* (MO, UC).

78. ***Thelypteris schunkei*** A. R. Sm., *sp. nov.*

Inter species subg. *Goniopteridis*, *T. urbanii* (Sodirol) A. R. Sm. proxima trichomatibus utrinque appressis sessilibus stellatis et indusiis stellato-pubescentibus, sed differt pinnis truncatis basi, pinnis proximalibus sessilibus vel brevistipitatis, pinnis crenatis vel vix lobatis margine, (3–)4–6 paribus venarum ex segmentis contiguus sub sinu conjunctis.

Stem suberect, caudex 1.5–3 cm in diameter, scales light brown, with numerous appressed, stellate trichomes 0.1 mm. **Leaves** few, 70–160 cm long, monomorphic. **Petiole** 30–80 cm × 3–8 mm, tan, glabrescent or with stellate trichomes ca. 0.1 mm. **Lamina** herbaceous, often verrucose, 1-pinnate with pinnae shallowly lobed, the apex abruptly reduced, similar to lateral pinnae, nearly or quite free. **Bud** absent in axil of distal pinna. **Rachis** with moderately dense to often dense stellate trichomes 0.1–0.15 mm. **Pinnae** mostly 9–13 pairs, sessile or stalked to 3 mm, mostly 15–20 × 2.8–4.5 cm, crenately incised to lobed to ca. ¼ their width, lowermost spreading, not narrowed at the base, truncate, auricles lacking. **Segments** mostly 5–8 mm wide, rounded to truncate at tip. **Veins** mostly (8–)10–14 pairs per segment, proximal (3–)4–6 pairs from adjacent segments usually uniting below sinus or the more distal ones connivent to a common vein that runs to sinus. **Indument** abaxially on costae, costules, veins, and laminar tissue

of moderately dense to dense, stellate trichomes 0.1–0.15 mm, branches of trichomes appressed to somewhat ascending, veins and laminar tissue adaxially with appressed, stellate trichomes 0.1 mm, acicular trichomes absent or nearly so throughout plant. Sori medial, indusiate, indusia with dense stellate trichomes; sporangia often with a few stellate trichomes 0.1 mm.

TYPE—Peru, Junín, Chanchamayo valley, *C. Schunke 54* (holotype, F!).

Lower montane rain forests, 300–900 m, San Martín and Junín.

This species is closely related to *T. urbanii* (Sodi-ro) A. R. Sm., from Nicaragua to Ecuador, but differs in the truncate (vs. broadly to narrowly cuneate) pinna bases, nearly sessile or short-stalked proximal pinnae, crenate-margined or very shallowly lobed pinnae, and greater number of pairs of anastomosing veins. It is also very close to *T. pennata*, but differs by the lighter green lamina, sessile (vs. many short-stalked), stellate trichomes on costae abaxially, arms of stellate trichomes often appressed (vs. often ascending), lowermost veins uniting at an obtuse (vs. acute) angle, veins all arising from costules (vs. lowermost one sometimes from costa), and more shallow-lobed pinnae with margin crenate or lobed less than $\frac{1}{4}$ the distance to costa.

San Martín: Prov. San Martín, 4 mi E of Tarapoto, *Woytkowski 35211* (MO, UC). Prov. Lamas, Dist. Lamas, 2–4 km N of San Antonio, along Río Cumbasa, *Belshaw 3537* (GH, UC). **Junín:** La Merced, Chanchamayo, *Soukup 1062* (F). Chanchamayo Valley, *C. Schunke 675* (F).

79. ***Thelypteris pennata*** (Poiret) Morton, Contr. U.S. Natl. Herb. 38: 64. 1967.

Polypodium pennatum Poiret in Lam., Encycl. 5: 535. 9 Jan 1804. TYPE: “Amer. Merid.,” collector not stated (holotype, P).

Polypodium megalodus Schkuhr, 24. Kl. Linn. Pfl.-Syst. [Krypt. Gew.] 1: 24, t. 19b. 1804. TYPE: Uncertain.

Dryopteris megalodus (Schkuhr) Urban, Symb. antill. 4: 21. 1903.

Thelypteris megalodus (Schkuhr) Proctor, Bull. Inst. Jamaica, Sci. Ser. 5: 61. 1953.

Goniopteris pennata (Poiret) Pic.-Ser., Webbia 31: 252. 1977.

Stem suberect to erect, scales brown, with numerous appressed, stellate trichomes 0.1 mm. **Leaves** few, 60–100(–125) cm long, monomorphic. **Petiole** 30–50 cm × 3–5 mm, brownish, gla-

brescent or with stellate trichomes ca. 0.1 mm, with a few persistent scales in proximal third. **Lamina** herbaceous, verrucose, 1-pinnate-pinnatifid, the apex abruptly reduced, similar to lateral pinnae but more triangular, nearly or quite free. **Bud** absent in axil of distal pinna. **Rachis** with dense, stellate trichomes 0.1–0.15 mm. **Pinnae** mostly 5–8(–10) pairs, stalked to 5 mm, mostly 14–18(–25) × 3–5 cm, shallowly lobed $\frac{1}{3}$ – $\frac{1}{2}$ their width, lowermost spreading, narrowed and broadly cuneate at the base, auricles lacking. **Segments** mostly 5–8 mm wide, rounded to truncate at tip. **Veins** mostly 9–14 pairs per segment, proximal pair from adjacent segments uniting below sinus with next 1–2(–3) pairs running to a common vein or to sinus. **Indument** abaxially on costae, costules, veins, and laminar tissue of moderately dense to dense, stellate trichomes 0.1–0.15 mm, branches of trichomes appressed to ascending, veins and laminar tissue adaxially with appressed, stellate trichomes 0.1 mm, acicular trichomes absent or nearly so throughout plant. **Sori** medial, indusiate, indusia with stellate trichomes; sporangia often with a few stellate trichomes 0.1 mm.

Lowland rain forests, 100–200 m, Amazonas and Loreto.

Antilles; Guianas; Venezuela; Colombia to Peru.

Lamina color in dried specimens of *T. pennata* is dark gray-green, in marked contrast to the grass-green or yellow-green leaves of *T. schunkei*.

Amazonas: La Poza, Río Santiago, *Berlin 3601* (MO). **Loreto:** Prov. Maynas, ca. 10 km SW of Iquitos at zoological park, *Moran 3669* (MO, UC). Prov. Maynas, ca. 50 mi downriver from Iquitos on Río Amazonas at Jensen’s Explorama lodge, *Moran 3725* (UC). Prov. Maynas, Alpuhuayo, ca. 26 km along Iquitos–“Nanto” (Nauta?) road, *van der Werff et al. 10229* (UC). San Antonio on Río Itaya, *Killip & Smith 29437* (F). Soledad, on Río Itaya, *Killip & Smith 29721* (F).

80. ***Thelypteris tetragona*** (Sw.) Small, Ferns s.e. States 256. 1938.

Polypodium tetragonum Sw., Prod. 132. 1788. TYPE: Jamaica, *Swartz* (holotype, s).

Goniopteris tetragona (Sw.) Presl, Tent. pterid. 183. 1836.

Dryopteris tetragona (Sw.) Urban, Symb. antill. 4: 20. 1903, not Kuntze (1891).

Stem short-creeping, scales brown, with stellate trichomes 0.1 mm. **Leaves** few, mostly 50–100 cm long, subdimorphic with the fertile longer-petioled

and with contracted pinnae. **Petiole** mostly 25–50 cm × 2–4 mm, tan, glabrescent or with stellate trichomes ca. 0.1 mm. **Lamina** herbaceous, not verrucose, 1-pinnate-pinnatifid, the apex abruptly reduced, similar to lateral pinnae, nearly or quite free. **Bud** absent in axil of distal pinna. **Rachis** with sparse to moderately dense, stellate and acicular trichomes 0.1–0.15 mm. **Pinnae** mostly 6–10 pairs, sessile, 7–15 × 1.5–2.5 cm, pinnatifid $\frac{1}{2}$ – $\frac{2}{3}$ their width, lowermost spreading or deflexed, narrowed with several pairs of reduced segments at the base, auricles lacking. **Segments** mostly 3–5 mm wide, rounded to truncate at tip. **Veins** mostly 6–10 pairs per segment, proximal pair from adjacent segments united below sinus with an excurrent vein to sinus, next pair running to or just above sinus. **Indument** abaxially on costae of sparse to moderately dense, mostly acicular and a few furcate trichomes 0.1–0.3 mm, veins and laminar tissue glabrous on both sides. **Sori** inframedial, exindusiate; sporangia with acicular trichomes 0.1 mm.

Edges of lowland forest, elevation not known, rare in Peru, department unknown.

Eastern and southern Mexico to Panama; Florida; Antilles; Colombia to Peru and Surinam.

Department unknown: Without locality data, *Soukup* 1163, 1164 (both ♀).

81. ***Thelypteris poiteana*** (Bory) Proctor, Bull. Inst. Jamaica, Sci. Ser. 5: 63. 1953.

Polypodium crenatum Sw., Prod. 132. 1788, not Forsk. (1775). TYPE: Jamaica, Swartz (holotype, s).

Lastrea poiteana Bory, Dict. class. 9: 233. 1825. TYPE: "Guiane" [presumably French Guiana], communiquée par Poiteau (presumably p, not found). *Dryopteris poiteana* (Bory) Urban, Symb. antill. 4: 20. 1903.

Goniopteris poiteana (Bory) Ching, Sunyatsenia 5: 239. 1940.

Stem short-creeping, ca. 5–10 mm in diameter, scales brown, with furcate and stellate trichomes 0.1 mm. **Leaves** few, mostly 50–100 cm long, monomorphic or nearly so. **Petiole** mostly 25–50 × 2–5 mm, stramineous to tan, glabrescent or with stalked-stellate trichomes 0.1–0.3 mm most numerous in adaxial groove, sometimes also with a few longer acicular trichomes. **Lamina** herbaceous, not verrucose, 1-pinnate, the apex abruptly reduced, free, similar to lateral pinnae. **Bud(s)** sometimes present in axil(s) of distal or proximal pin-

na(e). **Rachis** usually with moderately dense to dense, stellate, furcate, and acicular trichomes mostly 0.1–0.5 mm, sometimes glabrescent. **Pinnae** mostly 2–6 pairs, sessile or short-stalked to 2 mm, 9–15(–20) × 2.5–4.5(–6) cm, crenate to very shallowly lobed to ca. 2 mm, lowermost spreading or slightly ascending, narrowed at the base, auricles lacking. **Crenations** mostly 3–6 mm wide, rounded to truncate. **Veins** mostly 6–10 pairs per vein group, proximal 3–5 pairs from adjacent groups united below sinus with a common excurrent vein running to sinus. **Indument** abaxially on costae, veins, and laminar tissue of moderately dense to dense, mostly acicular trichomes mostly 0.2–1 mm, veins and laminar tissue adaxially similarly vested. **Sori** medial, exindusiate; sporangia with acicular trichomes 0.1–0.3 mm.

Margins of lowland rain forests, ca. 200 m, infrequent in Peru: Loreto and Huánuco.

Southern Mexico to Panama; Antilles; Colombia to the Guianas and Peru; northern Brazil; Galápagos.

Throughout the range of *T. poiteana*, buds are consistently borne in axils of proximal pinnae, a unique placement in subg. *Goniopteris*, but common in species of subg. *Meniscium*. However, *Mexia* 6367 (GH) has them in axils of distal pinnae, as in many species of *Goniopteris*.

Loreto: Washintsa and vicinity, Río Huasaga, *Lewis et al.* 11747 (MO). Above Pongo de Manseriche, mouth of Río Santiago, *Mexia* 6367 (G, GH, MO, NY, UC). Lower Río Nanay, *Ll. Williams* 371 (F). **Huánuco:** Tingo María, Valle de Huallaga, *Ridout* (GH, USM).

82. ***Thelypteris clypeata*** (Morton) Kramer, Acta Bot. Neerl. 18: 141. 1969.

Dryopteris clypeata Morton, Bull. Torrey Bot. Club 66: 52. 1939. LECTOTYPE (chosen here): Panama, Puerto Obaldía, San Blas coast, *Pittier* 4309 (us 679433!; isolectotypes, us!).

Stem short-creeping to suberect, ca. 5–10 mm in diameter, scales brown, with acicular trichomes 0.1 mm. **Leaves** few, to ca. 90 cm long, monomorphic or the fertile slightly longer-stalked and with narrower pinnae. **Petiole** to ca. 60 cm × 2–4 mm, tan, glabrous or glabrescent. **Lamina** chartaceous, not verrucose, 1-pinnate, apex similar to lateral pinnae, free. **Bud(s)** absent. **Rachis** usually glabrescent or with sparse acicular trichomes 0.1 mm. **Pinnae** 3–5 pairs, stalked to 5 mm, mostly

10–20 × 3–6 cm, cuneate at base, entire to subrepand or very shallowly crenate, proximal ones slightly ascending, broadly cuneate at the base, auricles lacking, apex cuspidate or acuminate. **Veins** mostly 10–17 pairs per vein group, regularly uniting with veins from adjacent vein groups to form rows of areoles between costa and margin (veins meniscioid), secondary veins straight to subsigmoid. **Indument** abaxially lacking or of sparse acicular trichomes 0.1 mm or less on costae and costules, veins and laminar tissue glabrous on both sides, stellate and furcate hairs apparently lacking everywhere. **Sori** medial, with vaulted indusia to 1.5 mm in diameter, bearing trichomes 0.1 mm; sporangia glabrous.

Lowland rain forest, 100 m, Ucayali.
Panama, Peru.

This peculiar species seems transitional between subgenera *Goniopteris* and *Meniscium*. It is aberrant in the former in the complete lack of furcate and stellate trichomes; from *Meniscium*, it differs from all known species by the very large indusia.

Ucayali: Rodal Semillero INIA, near Km 96, Pucallpa–Tingo María road, (as Loreto), *Maas et al.* 4591 (U, 2 sheets, USM).

The following collections, most of them incomplete, do not appear to match any known species of subg. *Goniopteris*; they may represent undescribed species or perhaps hybrids. Additional collections are necessary before adequate descriptions and diagnoses can be written.

Berlin 201 (F, MO, UC)—Amazonas, Río Cenepa, 300 m. Perhaps most similar to *T. biformata*, but the costal trichomes are all very short (0.2 mm or less) and ascending.

Velarde 5452 (GH)—Junín, Pueblo Pardo, 700 m. Closest to *T. lugubriiformis* but lacking aerophores, adaxial lamina lacking trichomes between veins, texture thinner.

Davis et al. 1314 (GH, 3 sheets)—Cuzco, prov. La Convención, Río Apurímac, 20 min below Puerto Capito above the Boca de Tigre rapids, 600 m. Most similar to *T. tristis* but differing in the narrower pinnae, lamina distally gradually reduced (conform apical pinna lacking).

Croat 20491 (UC)—Loreto, Río Tacsha Curaray. Most similar to *T. biformata* but the costal trichomes abaxially mostly stellate, 0.1–0.2 mm, less dense; pinnae ca. 3 cm broad with segments subfalcate, acute.

IIf. *Thelypteris* subg. *Meniscium*.

Thelypteris subg. *Meniscium* (Schreber) Reed, *Phytologia* 17: 254. 1968. **Figure 7.**

Meniscium Schreber, *Gen. pl.* (Linn.), ed. 8 (Schreber) 2: 757. TYPE: *Polypodium reticulatum* L. = *Thelypteris reticulata* (L.) Proctor.

Lamina 1-pinnate, with entire, undulate, crenulate, or serrate pinnae, rarely the lamina simple; proximal pinnae the longest or nearly so, distal pinnae gradually to abruptly reduced with a conform or subconform apical pinna; aerophores absent; buds sometimes in axils of proximal pinnae. **Veins** regularly anastomosing in pairs, with the cross-veins forming regular areoles in 4–25 rows between costa and margin, usually with a single excurrent, generally free veinlet arising at the point of fusion of the cross veins. **Indument**, if present, of acicular trichomes, these sometimes curved. **Sori** on the cross-veins, oblong or linear, straight or usually arcuate, infrequently in pairs between main lateral veins, rarely the sporangia acrostichoid (also arising between the veins), indusia always absent; sporangia glabrous or setose from the stalk or capsule; receptacular glands present in a few species. **Spores** with prominent winglike ridges, surface papillate or reticulate. $x = 36$.

Subgenus *Meniscium* comprises about 20 tropical American species, from Florida, the Antilles, and southern Mexico to northern Argentina and Paraguay. In general the species occur in lowland and montane rain forests, often along streams. Several species often grow in swampy sites. The distinctive venation found in subg. *Meniscium* also occurs in a few species of subg. *Goniopteris* and in many Paleotropical species of *Pronephrium*. It seems likely that this venation pattern has evolved independently in Old and New World species groups but is probably an indication of close affinity between *Goniopteris* and *Meniscium*.

References

- MAXON, W. R., AND C. V. MORTON. 1938. The American species of *Dryopteris* subgenus *Meniscium*. *Bull. Torrey Bot. Club* 65: 347–376.
MORTON, C. V. 1971. The proper disposition of *Meniscium macrophyllum* Kunze. *Amer. Fern J.* 61: 17–20.

Key to Species of subg. *Meniscium*

- a. Lamina simple, undivided 83. **T. gigantea**
- a. Lamina 1-pinnate b
 - b. Fertile pinnae with the sporangia appearing acrostichoid; sterile pinnae commonly more than 5 cm wide c
 - c. Pinnae margins entire; sporangia arising from cross-veins and laminar tissue 84. **T. macrophylla**
 - c. Pinna margins often undulate; sporangia arising only from cross-veins d
 - d. Sori with trichomes (sporangiasters) from receptacle or sporangial stalks; pinnae usually more than 4 cm wide 85. **T. chrysodioides**
 - d. Sori with receptacle and sporangial stalks glabrous; pinnae 1.5–3(–4) cm wide 91. **T. salzmannii**
 - b. Fertile pinnae with the sporangia in distinct sori confined to the arcuate cross-veins, or the sori sometimes confluent at maturity; sterile pinnae 1–8 cm wide e
 - e. Pinnae uncinately serrate, at least toward apex f
 - f. Distal pinnae greatly reduced; pinnae gradually attenuate from a broad base, mostly stalked; veins and usually lamina strongly pubescent abaxially 89. **T. serrata**
 - f. Distal pinnae not or only slightly shortened; pinnae narrowly oblong, rather abruptly acuminate-caudate at apex, mostly sessile; veins and lamina glabrous abaxially 90. **T. consobrina**
 - e. Pinnae undulate, crenulate, or usually subentire g
 - g. Sporangial stalks lacking trichomes h
 - h. Tubular yellow to orange glands borne on the receptacle or from the sporangial stalks i
 - i. Pinnae rounded to truncate at base, 5–15 lateral pairs; areoles 13–20-seriate between costa and margin; leaves usually more than 1 m long 97. **T. andreaea**
 - i. Pinnae cuneate at the base, 2–5 lateral pairs; areoles 7–10-seriate between costa and margin; leaves less than 1 m long 98. **T. arcana**
 - h. Tubular glands lacking from sorus j
 - j. Sori often biseriate between main lateral veins; pinnae 3–5 lateral pairs, broadly elliptic, cuneate at the base; distal pinnae strongly adnate and decurrent 96. **T. lingulata**
 - j. Sori nearly always uniseriate between main lateral veins; pinnae usually more than 5 lateral pairs, lanceolate or narrowly elliptic, truncate or cuneate at the base; distal pinnae not adnate k
 - k. Areoles of sterile pinnae about as broad as long, the secondary veins straight or nearly so l
 - l. Pinnae entirely glabrous, the proximal ones subcordate, sessile 94. **T. ensiformis**
 - l. Pinnae sparsely pubescent on the costae and veins, the proximal ones cuneate at base, long-stalked 95. **T. falcata**
 - k. Areoles of sterile pinnae much shorter than broad, the secondary veins curving, sometimes subsigmoid m
 - m. Costae, veins, and lamina abaxially with numerous short-stipitate glands 0.1 mm, trichomes entirely lacking 88. **T. maxoniana**
 - m. Costae, veins, and lamina abaxially lacking glands, trichomes present at least on costae and veins n
 - n. Pinnae narrowly cuneate at the base, usually less than 2(–2.5) cm wide; costae abaxially with appressed, curved trichomes; areoles 4–10(–13)-seriate 93. **T. angustifolia**
 - n. Pinnae broadly cuneate, rounded, or truncate at the base, 2–4 cm wide; costae abaxially with mostly spreading, crispate or straight trichomes; areoles mostly 8–16-seriate o

- o. Secondary veins (cross-veins) nearly straight, forming more or less rectangular areoles; costal trichomes dense; fertile pinnae with the sporangia in distinct sori 92. *T. lancea*
- o. Secondary veins curved or subsigmoid, areoles not rectangular; costal trichomes moderately dense; fertile pinnae with the sporangia appearing acrostichoid 91. *T. salzmannii*
- g. Sporangial stalks often bearing an acicular trichome, or sterile sporangia (sporangiasters) with such trichomes p
 - p. Trichomes of costae and lamina abaxially appressed; pinnae 4–7 cm wide 86. *T. membranacea*
 - q. Pinnae mostly 2–3(–4) cm wide 87. *T. arborescens*
 - q. Pinnae 3.5–8 cm wide 85. *T. chrysodioides*

83. *Thelypteris gigantea* (Mett.) R. Tryon, Rhodora 69: 6. 1967.

Meniscium giganteum Mett., Fil. Lechl. 1: 19. 1856.
 TYPE: Peru, (Puno), "St. Gavan" (San Gabán),
Lechler 2292 (holotype, b; isotype, κ).
Dryopteris gigantea (Mett.) C. Chr., Index fil. 267.
 1905 (not Kuntze, 1891).
Dryopteris simplicifrons C. Chr., Index fil. 486. 1906,
nom. nov. for *Dryopteris gigantea* (Mett.) C. Chr.,
 not Kuntze.

Stem short-creeping and then ascending to erect.
Leaves few, mostly 40–130 cm long, subdimorphic with fertile longer-petioled and with narrower blade. **Petiole** to 60 cm × 3–5 mm, brown, with scattered persistent lanceolate brown scales and dense, thin, appressed trichomes. **Lamina** simple, ovate to elliptic, mostly 30–70 × 7–15 cm, base rounded to cuneate, margin entire to crenate, apex acute to acuminate. **Bud** lacking. **Rachis** with dense, appressed trichomes like those of petiole. **Veins** from rachis ca. 8–10 mm apart on sterile blades, giving rise to more or less straight secondary veins that unite and give rise to an excurrent veinlet, these veinlets partially or completely bisecting the areole, daughter areoles rhomboid; areoles in rows of 25–35 between rachis and margin. **Indumentum** abaxially of numerous adpressed, thin trichomes ca. 0.3–0.5 mm long on veins, laminar tissue glabrous on both sides. **Sori** linear-arcuate along nearly the entire length of secondary veins; sporangial stalks with long-stalked, red to orange, spherical glands.

In lower montane rain forests, terrestrial or on wet rocks, 600–1100 m, San Martín, Huánuco, Pasco, Cuzco, and Madre de Dios.

Nicaragua to Panama; Colombia to Peru.

San Martín: Prov. Mariscal Cáceres, Dist. Campanilla, 7.4 km N of Pulcache, *Plowman & Schunke V. 11595* (F, USM). E of Tingo María, *Allard 21575* (GH), *22291* (GH). **Huánuco:** Prov. Huánuco, Tingo María, *Tryon & Tryon 5282* (F, GH, USM). **Pasco:** Pichis Trail, San Nicolás, (as Junín), *Killip & Smith 26018* (GH, US). **Cuzco:** Quince Mil, *Lockwood 569* (GH). **Madre de Dios:** Prov. Manú, Cerro de Pantiacolla, Río Palotoa, 10–15 km NNW of Shintuya, *R. Foster et al. 10902* (F).

84. *Thelypteris macrophylla* (Kunze) Morton, Amer. Fern J. 61: 17. 1971.

Meniscium macrophyllum Kunze, Flora 22, Beibl. 1: 44. 1839. TYPE: Brazil, Bahia, Serra do Mar, *Martius 363* (isotypes, BR, K, NY).
Meniscium guyanense Fée, (Mém. fam. foug. 5) Gen. fil. 224. 1852. TYPE: French Guiana, ad amnes Conana et Gaberet, *Leprieur* (holotype, P?).
Acrostichum fendleri Baker, J. Bot. 25: 100. 1887. TYPE: Trinidad, *Fendler 88* (holotype, κ; isotypes, NY, UCL, US).
Dryopteris macrophylla (Kunze) C. Chr., Index fil. suppl. 1: 35. 1913.
Dryopteris anceps Maxon, Contr. U.S. Natl. Herb. 24: 62. 1922. Based on *Acrostichum fendleri* Baker.
Bolbitis macrophylla (Kunze) Maxon & Morton, Bull. Torrey Bot. Club 65: 375. 1938.
Thelypteris guyanensis (Fée) Morton, Amer. Fern J. 61: 19. 1971.

Stem creeping. **Leaves** few, mostly 1–2 m long, subdimorphic to dimorphic, the fertile with longer petioles and contracted, more numerous pinnae. **Petiole** mostly 50–65 cm × 4–10 mm, tan to brownish, glabrescent. **Lamina** 1-pinnate, the sterile with 1–3(–6) pairs of pinnae and a larger terminal one, fertile pinnae ca. 4–7 lateral pairs; sterile pinnae up to 35 × 5–12 cm, short-petiolulate to sessile or sometimes slightly adnate to rachis, the base rounded to cuneate, margin entire or subrepand, apex acuminate; fertile pinnae ca. 8–20 ×

2–5 cm, stalked to 1 cm. **Bud** lacking. **Rachis** glabrous or glabrescent. **Veins** arising from costae ca. 3–5 per 3 cm on sterile pinnae, 8–15 per 3 cm on fertile pinnae, secondary veins straight or nearly so, uniting at an obtuse angle and giving rise to an excurrent veinlet, these veinlets mostly free and partially bisecting the areole; sterile areoles in rows of 16–30 between costa and pinna margin. **Indument** on sterile blades abaxially lacking or of sparse, thin trichomes 0.1–0.5 mm on costae and veins, laminar tissue usually glabrous on both sides; indument of fertile blades abaxially sparsely to decidedly pubescent with thin trichomes 0.1–0.5 mm long on costae, veins, and laminar tissue, adaxially with fewer similar trichomes to glabrescent. **Sporangia** appearing to cover the lamina (acrostichoid) on fully fertile blades; sporangial stalks glabrous (ours) or with minute trichomes 0.1 mm arising from capsule.

Lowland rain forests, 400–500 m, Loreto and Pasco.

Trinidad and Tobago; Guianas; eastern Venezuela; Ecuador; Peru; northern Brazil.

Because of its acrostichoid sporangia, this species was thought until rather recently to belong to *Bolbitis*, but it undoubtedly belongs in subg. *Menisium* (Morton, 1971). It may be closely related to *Thelypteris chrysodioides*.

Loreto: Above Pongo de Manseriche, ca. 1 km from mouth of Río Santiago, *Mexia* 6202 (F, GH, MO, UC, US), 6296 (GH). Quebrada Tahuayo above Tamishiyaco, *Croat* 19735 (F, GH, MO, UC, USM). Altura Tuta Pichco on Río Napo, *Croat* 20309 (F, GH, MO, UC). **Pasco:** Prov. Oxapampa, Palcazú Valley, Iscozacín, *R. Foster* 9496 (MO, USM). Prov. Oxapampa, Palcazú, Río Alto Iscozacín, Ozuz to Río Lobo, *R. Foster & d'Achille* 10068 (F, USM).

85. *Thelypteris chrysodioides* (Fée) Morton var. *goyazensis* (Maxon & Morton) Morton, Contr. U.S. Natl. Herb. 38: 51. 1967.

Dryopteris chrysodioides (Fée) Maxon & Morton var. *goyazensis* Maxon & Morton, Bull. Torrey Bot. Club 65: 374. 1938. TYPE: Brazil, Est. Goyaz, Rio Corumba, *Glaziou* 22631 (holotype, NY; isotypes, C, F!, UC!).

Stem unknown, probably creeping. **Leaves** mostly 70–200 cm long, monomorphic or subdimorphic, fertile leaves with longer petiole and contracted pinnae. **Petiole** up to 100 cm × 15 mm, tan, glabrescent. **Lamina** 1-pinnate, with up to ca.

10 pairs of lateral pinnae and a similar but slightly smaller terminal one; pinnae 18–40 × 3.5–8 cm, stalked up to ca. 5 mm, the base rounded to cuneate, margin subserrate to usually subrepand or crenate, apex acuminate. **Bud** lacking. **Rachis** with sparse trichomes or glabrescent. **Veins** arising from costae ca. 5–9 per 3 cm, secondary veins straight or subsigmoid, uniting at an obtuse to acute angle and giving rise to an excurrent veinlet, these veinlets free or completely bisecting the areole; sterile areoles in rows of 15–28 between costa and pinna margin. **Indument** of sterile blades abaxially of moderately dense to occasionally dense, spreading trichomes mostly 0.1–0.3(–0.4) mm on costae, veins, and laminar tissue, lamina adaxially nearly or quite glabrous. **Sori** elongate-arcuate on the cross-veins, sometimes confluent at maturity, mixed with filamentous structures (sporangia-sters?) bearing 1–3 trichomes; sporangial stalks glabrous or with trichomes to 0.2 mm.

Lowland forests, 100–260 m, San Martín, Loreto, and Madre de Dios.

Guyana; Brazil; Ecuador to Bolivia.

Klug 3970 and *Ridoutt* are largely sterile and so are determined only provisionally. Sterile fronds of this species seem to be much less pubescent abaxially than the fertile ones. In venation and length and shape of sori, this species is similar to *T. membranacea*, which differs in having appressed trichomes on costae and lamina abaxially.

This species is now known from Ecuador: Napo, Río Lagarto Cocha, near Redondo Cocha, 190 m, *Lawesson et al.* 44383 (AAU).

San Martín: Chaquta, Río Huallaga, *Klug* 3970 (GH, MO, NY, USM). **Loreto:** Mishuyacu, near Iquitos, *Klug* 200 (F, NY), 1533 (F, NY). **Junin:** Prov. Jauja, Satipo, *Ridoutt* [USM 11661] (GH). **Madre de Dios:** Prov. Tambopata, 30 air km SSW Puerto Maldonado at effluence Río La Torre/Río Tambopata, *Barbour* 5182 (MO, UC).

86. *Thelypteris membranacea* (Mett.) R. Tryon, *Rhodora* 69: 7. 1967.

Phegopteris membranacea Mett., Fil. lechl. 2: 22. 1859. LECTOTYPE (chosen by Maxon & Morton, 1938, p. 366): Peru, (Puno), prope Azángaro, *Lechler* 1785 (isolecotype, GH!; photo, GH of K). *Nephrodium lechleri* Hieron., Bot. Jahrb. Syst. 34: 448. 1904, *nom. superfl.* for *Phegopteris membranacea* Mett. and with the same type. *Dryopteris lechleri* (Hieron.) C. Chr., Index fil. 274. 1905, *nom. superfl.*

Stem ascending? **Leaves** mostly 100–150 cm long, monomorphic. **Petiole** up to 100 cm × 8 mm, brownish, pubescent with thin short trichomes to 0.3 mm. **Lamina** 1-pinnate, with ca. 4–6 pairs of lateral pinnae and a similar terminal one; pinnae 18–30 × 4–7 cm, sessile or stalked to ca. 5 mm, the base rounded or truncate, margin subentire or obscurely crenulate, apex acuminate. **Bud(s)** present in axil of proximal pinna(e). **Rachis** with often dense, more or less appressed, thin, crispate trichomes. **Veins** arising from costae of fertile pinnae ca. 8–10 per 3 cm, secondary veins straight, uniting at an obtuse angle and giving rise to an excurrent veinlet, these veinlets free or completely bisecting the areole into two equal squares; sterile areoles in rows of ca. 18–20 between costa and pinna margin. **Indument** on sterile blades abaxially of moderately dense to dense, thin, appressed trichomes mostly 0.2–0.4 mm on costae, veins, and laminar tissue, lamina adaxially nearly or quite glabrous. **Sori** elongate, straight or slightly arcuate on the cross-veins, not confluent at maturity, mixed with filamentous structures (sporangia-sters?) bearing 1–3 trichomes; sporangial stalks glabrous or with trichomes to 0.2 mm.

Lowland rain forests, 250–650 m, San Martín, Cuzco, and Puno.

Colombia to Peru; Venezuelan specimens attributed to this species seem to represent an undescribed species.

This species is aptly named, being thinner in texture than most other species of subg. *Meniscium*. It differs further in the peculiar, appressed, and thin pubescence (a character it shares with *T. gigantea*) and in the straight (rather than curved) sori. The Klug collections cited by Maxon and Morton (1938) under this species are referred here to *T. chrysodioides*.

San Martín: Mt. Campana, prope Tarapoto, *Spruce* 4645 (K, not seen, US). **Cuzco:** Prov. Quispicanchi, entre Inambari y Quince Mil, *Vargas* 16501 (GH).

87. *Thelypteris arborescens* (Willd.) Morton, Contr. U.S. Natl. Herb. 38: 50. 1967.

Meniscium arborescens Willd., Sp. pl. ed. 4. 5: 133. 1810. TYPE: Venezuela, *Humboldt & Bonpland* (holotype, B, *Herb. Willd.* 19576; microfiche, UC). *Phegopteris mollis* Mett., Ann. Sci. Nat. Bot., V, 2: 242. 1864. TYPE: Colombia, *Triana* (holotype, B?; isotype, BM!).

Dryopteris permollis Maxon & Morton, Bull. Torrey

Bot. Club 65: 372. 1938. Based on *Phegopteris mollis* Mett., not *Dryopteris mollis* (Jacq.) Hieron.

Stem short-creeping to ascending. **Leaves** mostly 70–150 cm long, monomorphic or nearly so. **Petiole** 30–70 cm × 5–8 mm, stramineous to tan, glabrescent to pubescent with trichomes to 0.3 mm. **Lamina** 1-pinnate, with ca. 10–25 pairs of lateral pinnae and a similar terminal one; pinnae mostly 12–22 × 2–3.5 cm, sessile or lowermost stalked to ca. 2(–5) mm, the base rounded or truncate, margin subentire or obscurely crenulate, apex acute to acuminate. **Bud(s)** absent. **Rachis** with often sparse to moderate, spreading trichomes. **Veins** arising from costae of fertile pinnae ca. 12–19 per 3 cm, secondary veins straight (fertile) to arcuate or subsinuate (sterile), uniting at an obtuse (fertile) to acute (sterile) angle and giving rise to usually free excurrent veinlet; sterile areoles in rows of ca. 8–15 between costa and pinna margin. **Indument** abaxially of moderately dense to dense, spreading trichomes mostly 0.2–0.5 mm on costae, veins, and laminar tissue, lamina adaxially nearly or quite glabrous except along costae. **Sori** oblong, straight or slightly arcuate on the cross-veins, sometimes confluent at maturity, mixed with trichomes like those of axes; sporangial stalks glabrous or with trichomes to 0.2 mm.

In lowland and montane forests, along streams, 100–1100 m, San Martín, Loreto, Huánuco, Pasco, and Puno.

Honduras to Panama; Colombia to Venezuela and Bolivia; Brazil.

The differences between this species and *T. longifolia* (Desv.) R. Tryon are slight and the two should perhaps be combined. *Thelypteris longifolia* is said (by Maxon & Morton, 1938) to differ by the cuneate pinna bases, longer stalked pinnae, and shorter and less dense pubescence. I see nearly a continuum between the extremes.

San Martín: NW of San Martín, Rioja, Río Negro, *Soukup* 5219 (GH). Rioja, NW of San Martín, Río Negro, *Soukup* 5221 (GH). **Loreto:** Quebrada de Nauta, along Río Marañón, *Croat* 17530 (MO). Brillo Nuevo, Yaguayacu River, Dist. Pebas, ca. 150 km ENE of Iquitos, *Treacy & Alcorn* 253A (F). Prov. Loreto, Nauta, Río Marañón above mouth of Río Ucayali, *Gentry et al.* 29975 (MO). Prov. Alto Amazonas, Yurimaguas, ca. 30 km towards Tarapoto, *Hormia* 2086 (H). **Huánuco:** Pampayacu, *Kanehira* 129 (GH, US). **Pasco:** Prov. Oxapampa, Iscozacín, near confluence of Río Palcazú and Río Iscozacín, *D. Smith* 1952 (MO). **Puno:** Prov. Sandia, between Río Azata–Colorado, *Núñez & Muñoz* 5347 (MO).

88. *Thelypteris maxoniana* A. R. Sm., *sp. nov.*
Figure 7.

Dryopteris desvauxii f. *glandulosa* Maxon & Morton, Bull. Torrey Bot. Club 65: 372. 1938. TYPE: Brazil, São Paulo, Morro das Pedra, *Brade 5753* (holotype, NY).

Thelypteris longifolia R. Tryon f. *glandulosa* (Maxon & Morton) Morton, Contr. U.S. Natl. Herb. 38: 52. 1967.

A speciebus ceteris subg. *Meniscii* distinguenda trichomatibus ad laminam abaxialiter nullis, et glandibus abundantibus luteolis brevistipitatis 0.1 mm longis ad costas et venas et spatia intervenas.

Stem short-creeping to ascending. **Leaves** mostly 80–150 cm long, monomorphic or nearly so. **Petiole** 30–90 cm × 5–8 mm, stramineous to tan, glabrous. **Lamina** 1-pinnate, with ca. 10–20 pairs of lateral pinnae and a similar terminal one; pinnae mostly (12–)20–35 × (1–)2–3(–4) cm, sessile or lowermost stalked to ca. 5 mm, the base cuneate to rounded or truncate, margin subentire or obscurely crenulate, apex acute. **Bud(s)** absent. **Rachis** glabrous or sparsely glandular. **Veins** arising from costae of fertile pinnae ca. 8–13 per 3 cm, secondary veins straight (fertile) to arcuate or subsinuate (sterile), uniting at an obtuse (fertile) to acute (sterile) angle and giving rise to usually free excurrent veinlet; areoles in rows of ca. 8–15 between costa and pinna margin. **Indument** abaxially of moderately dense to dense, light yellowish, short-stipitate glands 0.1 mm long on costae, veins, and laminar tissue, lamina adaxially glabrous, even on costae. **Sori** oblong, straight or arcuate on the cross-veins, sometimes confluent at maturity, lacking trichomes; sporangial stalks glabrous.

TYPE—Peru, Prov. Maynas, Quistococha, vicinity of Iquitos, *Gentry 20751* (holotype, MO!; isotype, UC!).

In swamps, along roadsides and streams, often on white sand, 100–130 m, Loreto.

Colombia; Bolivia; probably Brazil.

It is uncertain whether the type of f. *glandulosa*, from southern Brazil, is really conspecific with the Peruvian plant. In any case, the epithet *glandulosa* cannot be transferred to *Thelypteris* because of the preexisting *T. glandulosa* (Desv.) Proctor. Thus, I give this species a new description and type.

This is actually one of the most easily recognizable species of subg. *Meniscium*, and it certainly warrants more than form status given it by Maxon and Morton. It is easily distinguished from *T. longifolia* by the complete lack of trichomes on the

lamina abaxially. It is possible that its closest relative is indeed that species because of the general similarity in size, venation, and pinna shape. *Thelypteris maxoniana* seems to be one of the commonest meniscioids in Amazonian Peru.

Loreto: 7 km NE of Río Nanay, *Croat 18312* (MO). 7 km NE of Puerto Almendra at Río Nanay, *Croat 18333* (F, MO, UC, USM). 17 km SW of Iquitos, *Croat 18435* (MO, UC). Quebrada Tahuayo, above Tamishiyaco, *Croat 19759* (MO). Prov. Maynas, Dist. Iquitos, Río Nanay, trail between Río Mazán and Picuruyacu, *Hickok 613* (GH). Mishuyacu, near Iquitos, *Klug 509* (F, US), *1255* (F, NY). Prov. Maynas, San Juan, *Müller & Müller 2517* [USM 14231] (GH). Prov. Maynas, Dist. Iquitos, Puerto Almendra, Río Nanay, *Revilla 1249* (MO). Vicinity of Iquitos, *Revilla 3515* (MO). Prov. Maynas, Quistacocha, *Sagástegui & Aldave 5794* (GH). Prov. Maynas, 3 km S of Iquitos, *Tryon & Tryon 5164* (GH, USM).

89. *Thelypteris serrata* (Cav.) Alston, Kew Bull. 1932: 309. 1932.

Meniscium serratum Cav., Descr. pl. 548. 1802. TYPE: Cuba, Havana, *Guio* (holotype, MA).
Dryopteris serrata (Cav.) C. Chr., Index fil. 291. 1905.

Stem short-creeping to ascending. **Leaves** mostly 100–200 cm long, monomorphic or subdimorphic, the fertile with generally contracted pinnae. **Petiole** 30–90 cm × 5–18 mm, stramineous to tan, glabrous or glabrescent. **Lamina** 1-pinnate, with ca. 15–25 pairs of gradually shortened lateral pinnae and a small, lanceolate, terminal one; pinnae mostly 12–25 × 2–3.5(–4.5) cm, sessile or lowermost stalked to ca. 4 mm, the base rounded or truncate, margin serrate or uncinat-serrate, apex acute. **Bud(s)** absent or occasionally borne at base of proximal pinnae. **Rachis** with sparse to dense trichomes. **Veins** arising from costae of fertile pinnae ca. 8–13 per 3 cm, secondary veins straight (fertile) to arcuate or subsinuate (sterile), uniting at an obtuse (fertile) to acute (sterile) angle and giving rise to usually free excurrent veinlet; areoles in rows of ca. 10–15 between costa and pinna margin. **Indument** abaxially of moderately dense to dense, spreading or curved trichomes mostly 0.15–0.3 mm on costae, veins, and sometimes laminar tissue, lamina adaxially glabrous except along costae. **Sori** oblong to linear, straight or arcuate on the cross-veins, often somewhat confluent at maturity, lacking trichomes; sporangial stalks glabrous.

Marshes, swamps, roadside ditches, along streams, sometimes in full sun, 100–900(–1650)

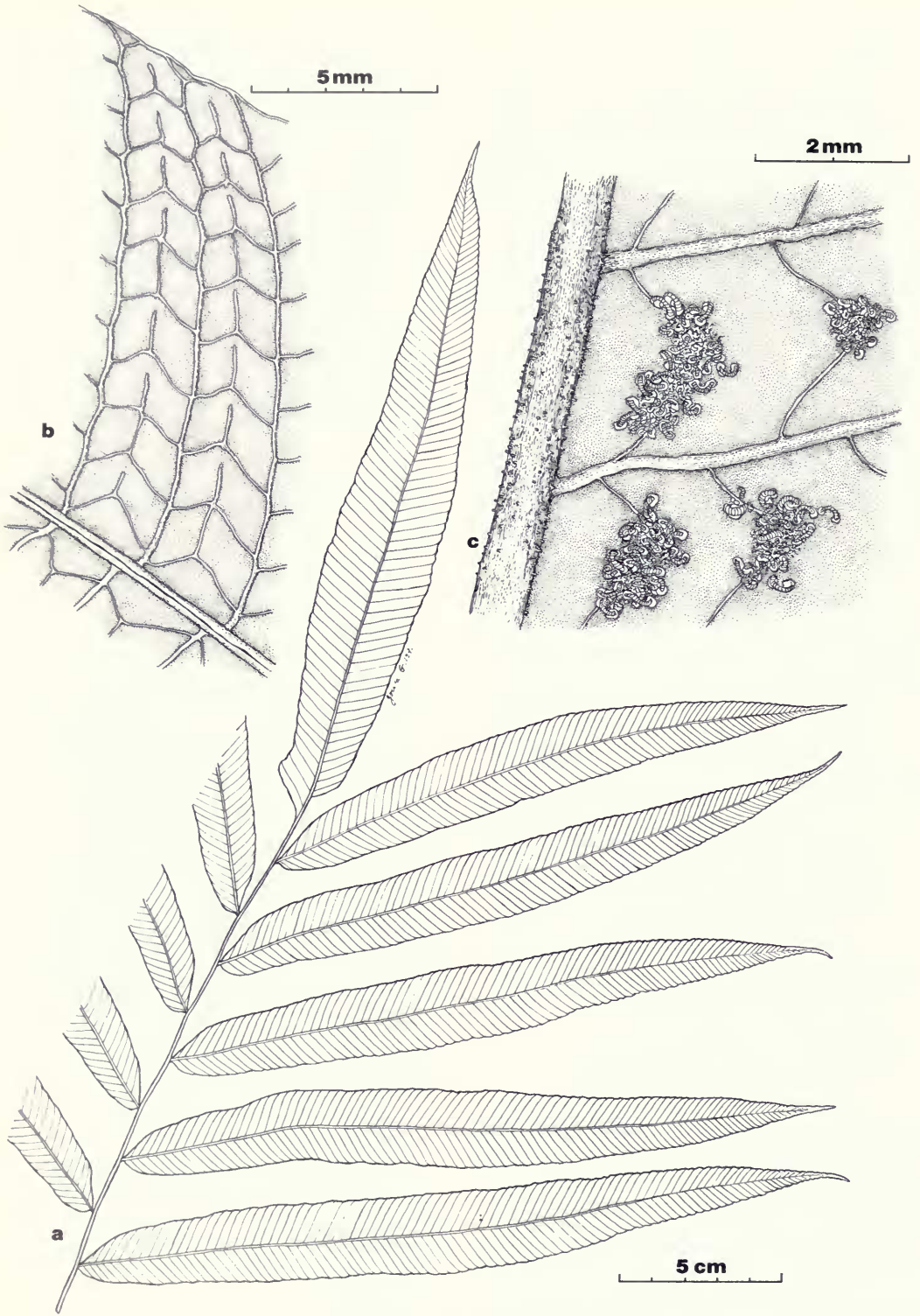


FIG. 7. Subgenus *Meniscium*. *Thelypteris maxoniana*: a, leaf apex; b, portion of pinna, adaxial side; c, portion of pinna, abaxial side. (From Croat 18435, uc.)

m, Amazonas, Loreto, Junín, Cuzco, and Madre de Dios.

Florida; Antilles; Mexico to Panama; Colombia to Guianas and Bolivia; Brazil; northern Argentina; Paraguay.

Amazonas: Prov. Bagua, Chiriaco to Puente Venezuela, 3.9 km NE of Chiriaco, *Barbour 4336* (MO, USM). **Loreto:** Iquitos, *Killip & Smith 27036* (F, GH, US). Mishuyacu, near Iquitos, *Klug 431* (F, US). Río Parapapura above Yurimaguas, *Croat 17942* (MO). **Pasco:** Oxapampa, Río Iscozacín tributary of Río Palcazú, *Knapp et al. 7835* (MO). **Junín:** Satyro alrededores, *León 200* (MO). **Cuzco:** Prov. Paucartambo, Kosñipata–Pilcopata, *Vargas 14749* (GH). Quispicanchi, Fortaleza a Quince Mil, *Vargas 16539* (GH). Prov. La Convención, ca. halfway from Luisiana and Río Apurímac to Camp 1, *Dudley 10157* (GH). **Madre de Dios:** Prov. Manú, Sintuya, *Alfaro 827* (MO). Prov. Tambopata, Dist. Tambopata, jct. Río La Torre and Río Tambopata, *Young 117* (MO, UC).

90. ***Thelypteris consobrina*** (Maxon & Morton) R. Tryon, *Rhodora* 69: 5. 1967.

Dryopteris consobrina Maxon & Morton, Bull. Torrey Bot. Club 65: 356. 1938. TYPE: Peru, Junín, near La Merced, *Killip & Smith 24087* (holotype, us!, 3 sheets; isotype, NY).

Stem creeping. **Leaves** mostly 100–250 cm long, subdimorphic, the fertile with contracted pinnae. **Petiole** up to 120 cm × 8–15 mm, stramineous to tan, glabrous or glabrescent. **Lamina** 1-pinnate, with ca. 8–12 pairs of lateral pinnae and a similar, large terminal one; pinnae mostly 20–35 × 4–7 cm, sessile or lowermost stalked to ca. 4 mm, the base rounded or truncate, margin serrate or uncinately-serrate, apex acute to acuminate. **Bud(s)** absent or occasionally borne at base of proximal pinnae. **Rachis** glabrous or nearly so. **Veins** arising from costae of fertile pinnae ca. 8–13 per 3 cm, secondary veins straight (fertile) to slightly arcuate (sterile), uniting at a generally obtuse angle and giving rise to usually free excurrent veinlet; areoles in rows of ca. 15–25 between costa and pinna margin. **Indument** abaxially lacking or of sparse trichomes mostly 0.1–0.2 mm on costae, trichomes more numerous on fertile costae, veins and laminar tissue glabrous, lamina adaxially glabrous except along costae. **Sori** oblong to linear, straight or arcuate on the cross-veins, crowded at maturity, lacking trichomes; sporangial stalks glabrous.

Lowland and montane forests, along streams and edges of forests, 400–2000 m, Huánuco, Pasco, Junín, and Ayacucho.

Known only from Peru.

Huánuco: Tingo María to Pucallpa, *Ellenberg 3818* (GH). Along Río Monzón, a few miles above Tingo María, *Hodge* (GH, UC). Huacachi, estación near Muña, *Macbride 4170* (F). Río Huallaga, above Río Cayumba, *Mexia 8315* (F, GH, MO, UC). **Pasco:** Prov. Oxapampa, Gran Pajonal, vicinity of Chequitave, *D. Smith 5261* (MO, UC). **Junín:** La Merced, Chanchamayo, *C. Schunke (Rosenst. exsicc. 17)* (A, UC). **Ayacucho:** Río Apurímac Valley, near Kimpitiriki, *Killip & Smith 22945* (F).

91. ***Thelypteris salzmannii*** (Fée) Morton, Los Angeles County Mus. Contr. Sci. 35: 7. 1960.

Meniscium salzmannii Fée, (Mém. foug. 5) Gen. fil. 223. 1852. TYPE: Brazil, Bahia, *Salzmann* (isotypes, B, C, NY).

Dryopteris salzmannii (Fée) Maxon & Morton, Bull. Torrey Bot. Club 65: 357. 1938.

Stem short-creeping to suberect. **Leaves** mostly 100–180 cm long, subdimorphic, the fertile longer and with contracted pinnae. **Petiole** up to 110 cm × 8–15 mm, stramineous to tan, glabrescent to moderately pubescent. **Lamina** 1-pinnate, with ca. 10–22 pairs of progressively shorter lateral pinnae and a similar, generally small terminal one; pinnae mostly 12–22 × 1.5–3(–4) cm, often strongly ascending ca. 45° from rachis, sessile or lowermost stalked to ca. 2 mm, the base rounded or truncate, margin entire to crenulate, apex acute to acuminate. **Bud(s)** often borne at base of proximal pinnae. **Rachis** glabrescent or pubescent. **Veins** arising from costae of fertile pinnae ca. 12–18 per 3 cm, secondary veins generally arcuate or subsigmoid, uniting at an obtuse to generally acute angle and giving rise to usually free excurrent veinlet; areoles in rows of ca. 8–16 between costa and pinna margin. **Indument** abaxially of sparse to moderately dense trichomes mostly 0.1–0.3 mm on costae, trichomes more numerous on fertile costae, veins and laminar tissue glabrous, lamina adaxially glabrous except along costae. **Sori** oblong, generally arcuate on the cross-veins, crowded and often becoming confluent at maturity with blades appearing acrostichoid, lacking trichomes; sporangial stalks glabrous.

Lowland and montane forests, along streams, swamps, and thickets, 450–1200 m, Amazonas, San Martín, Huánuco, Pasco, Cuzco, and Madre de Dios.

Venezuela and Colombia to Bolivia; Brazil.

Amazonas: Prov. Bagua, valley of Río Marañón above Cascadas de Mayasi near Campamento STte. [sic] Montenegro, *Wurdack 1829* (GH, USM). **San Martín:** Zepe-lacio, near Moyobamba, *Klug 3354* (F, GH, MO). **Huánu-co:** Pampayacu, Hacienda at mouth of Río Chinchao, *Macbride 5046* (F, GH, US). **Pasco:** Outskirts of Pozúzo, near Río Pozúzo, *Gentry et al. 40089* (MO, UC). Prov. Oxapampa, Gran Pajonal, via Chequitavo, *D. Smith 5282* (MO, UC). **Cuzco:** Tumbaimayo–Quispicanchi, *Vargas 11788* (GH). **Madre de Dios:** Prov. Manú, Hda. Defenza, *Vargas 15205* (GH).

92. *Thelypteris lancea* A. R. Sm., *sp. nov.*

Ex affinitate *T. angustifolia* (Willd.) Proctor et specierum affinium subg. *Menciscii* sed distinguenda trichomatibus patentibus rectis ad costas abaxialiter, pinnis sterilibus usque ad 3.5 cm latis, pinnis proximalibus sessilibus vel brevistipitatis usque ad 2 mm basi rotundatis vel truncatis.

Stem creeping. **Leaves** ca. 100 cm long, subdimorphic, the fertile with contracted pinnae. **Petiole** up to 60 cm × 8 mm, tan to brown, glabrescent to moderately pubescent. **Lamina** 1-pinnate, with ca. 10–16 pairs of lateral pinnae and a similar terminal one; sterile pinnae up to ca. 22 × 3.5 cm, fertile to ca. 15 × 1.5 cm, sessile or lowermost stalked to ca. 2 mm, the base rounded or truncate, margin entire (sterile) to crenulate (fertile), apex acuminate. **Bud(s)** not seen. **Rachis** glabrescent or pubescent. **Veins** arising from costae of fertile pinnae ca. 13 per 3 cm, secondary veins straight (fertile) to arcuate or subsigmoid (sterile), uniting at an obtuse (fertile) to acute (sterile) angle and giving rise to usually free excurrent veinlet; areoles in rows of ca. 9–15 between costa and pinna margin. **Indument** abaxially of moderately dense, patent trichomes mostly 0.1–0.2 mm on costae, trichomes more numerous on fertile costae, veins and laminar tissue glabrous, lamina glabrous adaxially except along costae. **Sori** arcuate on the cross-veins, crowded and subconfluent at maturity, lacking trichomes; sporangial stalks glabrous.

TYPE—Peru, Pasco, Prov. Oxapampa, Palcazú, Río Alto Iscozacín, Ozuz to Río Lobo, *R. Foster & d'Achille 10061* (holotype, F!; isotype, USM!).

Along forested trail, 400–500 m, Pasco.

Peru; Bolivia.

This is most similar and probably most closely related to *T. angustifolia*, from which it differs in the spreading (vs. curved and appressed) trichomes on the abaxial costae, the broader sterile pinnae, and the lanceate pinnae that are not narrowly cuneate at the base. A duplicate of the para-

type cited below was determined as *T. serrata* by Maxon and Morton (1938), but the UC specimen resembles that species only remotely.

Paratype: Bolivia, Dept. Santa Cruz, Prov. Sara, Río Japacani, 400 m, *Steinbach 7500* (UCL).

93. *Thelypteris angustifolia* (Willd.) Proctor, Bull. Inst. Jamaica, Sci. Ser. 5: 57. 1953.

Polypodium salicifolium Vahl, *Ecol. amer.* 3: 51. 1807. (not *Thelypteris salicifolia* (Hooker) Reed, 1968). **TYPE:** Montserrat, *Ryan* (holotype, c).

Menciscium angustifolium Willd., *Sp. pl. ed. 4. 5:* 133. 1810. **TYPE:** Venezuela, Caracas, *Bredemeyer* (holotype, v, *Herb. Willd. 19574*; microfiche, UC).

Dryopteris angustifolia (Willd.) Urban, *Symb. antill.* 4: 21. 1903.

Stem short- to long-creeping. **Leaves** ca. 30–100(–130) cm long, subdimorphic, the fertile with contracted pinnae. **Petiole** 15–50(–85) cm × 3–10 mm, tan to stramineous, glabrescent to moderately pubescent. **Lamina** 1-pinnate, with (6–)8–20 pairs of lateral pinnae and a similar terminal one; pinnae (5–)10–15(–18) × (0.5–)1–2(–2.5) cm, sessile or lowermost stalked to ca. 5 mm, the base cuneate, margin entire (sterile) to crenulate (fertile), apex acuminate. **Bud(s)** not seen. **Rachis** usually pubescent with falcate or crispate trichomes. **Veins** arising from costae of fertile pinnae ca. 11–18 per 3 cm, secondary veins straight (fertile) to arcuate or subsigmoid (sterile), uniting at an obtuse to acute angle and giving rise to usually free excurrent veinlet; areoles in rows of ca. 4–10(–13) between costa and pinna margin. **Indument** abaxially of sparse to usually moderately dense, falcate-ascending to crispate trichomes mostly 0.1–0.2 mm on costae, especially of fertile blades, veins and laminar tissue glabrous, lamina glabrous adaxially except along costae. **Sori** arcuate on the cross-veins, crowded and subconfluent at maturity, lacking trichomes; sporangial stalks glabrous.

In lowland and montane rain forests, along streams and on wet rocks, possibly sometimes a rheophyte, 200–1200 m, Amazonas, San Martín, Loreto, Huánuco, Pasco, Junín, Ucayali, and Cuzco.

Antilles; southern Mexico to Panama; Colombia and Venezuela to Bolivia; southern Brazil; Paraguay.

Amazonas: Prov. Bagua, Chiriaco to Puente Venezuela, 43 km NE of Chiriaco, *Barbour 4399* (MO, USM). **San Martín:** Prov. Mariscal Cáceres, Dist. Tocache Nuevo,

Puerto Pizana, *Schunke 4665* (F, GH, MO, USM). Chazuta, Río Huallaga, *Klug 4035* (F, GH, MO, UC). Lamas, Km 47.9 of Tarapoto-Yurimaguas road, *Knapp & Mallet 8473* (F, MO). Tarapoto, *Ll. Williams 6136* (F). **Loreto:** Above Pongo de Manseriche, Río Santiago, *Mexia 6167* (BH, F, GH, MO, UC, Z). **Huánuco:** Prov. Huánuco, Tingo María, *Tryon & Tryon 5338* (GH, USM). **Pasco:** Prov. Oxapampa, Gran Pajonal, vicinity of Chequitavo, *D. Smith 5311* (F, MO, UC). **Junín:** Río Paucartambo Valley, near Perené Bridge, *Killip & Smith 25260* (F, US). **Ucayali:** Coronel Portillo, Pucallpa-Lima Hwy, Km 85 (as Loreto), *McDaniel 13943* (GH, USM). **Cuzco:** Prov. Paucartambo, Pilcopata, *Vargas 11640* (GH).

94. *Thelypteris ensiformis* (C. Chr.) R. Tryon, *Rhodora* 69: 5. 1967.

Dryopteris ensiformis C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 10: 269, f. 46. 1913. TYPE: Costa Rica, La Palma, *Tonduz 12533* (holotype, ♀; isotype, us!).

Stem creeping. **Leaves** ca. 200–300 cm long, monomorphic. **Petiole** ca. 130–170 cm × 1–2 cm, tan to stramineous, glabrous. **Lamina** 1-pinnate, with up to ca. 10 pairs of lateral pinnae and a similar terminal one; pinnae to 25–40 × 4–6 cm, sessile, the base truncate to rounded, margin entire to crenulate, apex acute. **Bud(s)** not seen. **Rachis** glabrous. **Veins** arising from costae of fertile pinnae ca. 10 per 3 cm, secondary veins straight or slightly curved, uniting at an obtuse angle and giving rise to usually free excurrent veinlet; areoles in rows of ca. 12–15 between costa and pinna margin, about as long as broad. **Indument** abaxially lacking, veins and laminar tissue glabrous, lamina adaxially glabrous except along costae. **Sori** arcuate on the cross-veins, distinct at maturity, lacking trichomes; sporangial stalks glabrous.

In montane rain forest, 1400–1700 m, Junín.

Costa Rica; Venezuela; Ecuador; Peru.

This rare species has also recently been found in Ecuador: Napo, *Foster 85-137-A* (UC).

Junín: Schunke Hacienda, above San Ramón, *Killip & Smith 24651* (F, NY, US).

95. *Thelypteris falcata* (Liebm.) R. Tryon, *Rhodora* 69: 6. 1967.

Meniscium falcatum Liebm., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., V, 1: 183. 1849. LECTOTYPE (chosen by Smith, Fl. Chiapas 2: 234. 1981): Mexico, Oaxaca, Distr. Chinantla, *Liebmann* Fl. Mex. 680 (c!; isotypes, k!, us!).

Meniscium jurgensenii Fée, (Mém. foug. 5) Gen. fil. 223. 1852. TYPE: Mexico, *Jurgensen 917* (holotype, not found at ♀).

Dryopteris falcata (Liebm.) C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 10: 270. 1913, not Kuntze, 1891.

Dryopteris jurgensenii (Fée) Maxon & Morton, Bull. Torrey Bot. Club 65: 360. 1938.

Stem creeping to suberect. **Leaves** mostly ca. 100–250 cm long, monomorphic. **Petiole** up to ca. 130 cm × 1 cm, tan to stramineous, glabrous. **Lamina** 1-pinnate, with mostly 8–12 pairs of lateral pinnae and a similar terminal one; pinnae to ca. 30(–40) × 3–5 cm, the proximal ones stalked to 5–30 mm, the base cuneate, margin entire to crenulate, apex acuminate. **Bud(s)** not seen. **Rachis** glabrous or sparsely pubescent. **Veins** arising from costae of fertile pinnae ca. 8–12 per 3 cm, secondary veins straight or slightly subsigmoid, uniting at an obtuse angle and giving rise to an excurrent veinlet that is free or often completely bisects the areole into two subequal rhomboid halves; areoles in rows of mostly 10–15 between costa and pinna margin, about as long as broad. **Indument** abaxially of sparse trichomes 2–3 mm long, veins and laminar tissue glabrous, lamina glabrous adaxially except along costae. **Sori** oblong to arcuate on the cross-veins, distinct at maturity, lacking trichomes; sporangial stalks glabrous.

In montane rain forests, 800–1600 m, Pasco, Junín, and Cuzco.

Cuba; southern Mexico to Panama; Colombia to Bolivia.

Pasco: Pichis trail, Yapas (as Junín), *Killip & Smith 25570* (NY, US). **Junín:** E of Quimiri Bridge, near La Merced, *Killip & Smith 23890* (F, NY, US). **Cuzco:** Prov. La Convención, Abra de Ichiquiatio, *Vargas 14486* (GH).

96. *Thelypteris lingulata* (C. Chr.) Morton, Contr. U.S. Natl. Herb. 38: 43. 1967.

Dryopteris lingulata C. Chr., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Afd., ser. 7, 10: 271. 1913. TYPE: Costa Rica, vallée du Río Hondo, près Madre de Dios, *Pittier 10349* (holotype, ♀).

Stem creeping. **Leaves** mostly ca. 150–200 cm long, monomorphic. **Petiole** up to ca. 110 cm × 1 cm, tan to stramineous, glabrous. **Lamina** 1-pinnate, with mostly 3–5 pairs of elliptic lateral pinnae and a similar terminal one; pinnae 20–35 × 5–10 cm, the proximal ones stalked to 1–2(–4)

n, the base cuneate, margin entire to crenate, apex acuminate. **Bud(s)** not seen. **Rachis** glabrous. **Veins** arising from costae of fertile pinnae ca. 4–6 per 3 cm, secondary veins straight (fertile) to subsigmoid (sterile), uniting at an obtuse angle and giving rise to an excurrent usually free veinlet; areoles of fertile pinnae 2–3 times broader than long, in rows of mostly 17–22 between costa and pinna margin. **Indument** abaxially lacking or of sparse trichomes 0.1 mm on costae, veins and pinar tissue glabrous, lamina adaxially glabrous. **Sori** oblong to arcuate on the cross-veins, often biseriate between main lateral veins and the sori round to oblong, in either case not confluent over the lamina at maturity, lacking trichomes; sporangial stalks glabrous.

Lowland rain forests, 100–500 m, Loreto and Huánuco.

Nicaragua to Panama; Colombia to Peru.

Loreto: San Antonio, on Río Itaya, *Killip & Smith 378* (NY, US). **Cuzco:** Prov. Quispicanchi, entre Machicie e Inambari, *Vargas 16459* (GH).

98. ***Thelypteris andreana*** (Sodirol) Morton, Contr. U.S. Natl. Herb. 38: 50. 1967.

Menisicium andreanum Sodirol, Recens. crypt. vasc. Quit. 71. 1883. TYPE: Ecuador, Río Toachi, near Santo Domingo, *Sodirol* (not located).

Dryopteris andreana (Sodirol) C. Chr., Index fil. 252. 1905.

Stem short-creeping. **Leaves** mostly ca. 100–250 cm long, monomorphic or often subdimorphic. **Petiole** up to ca. 100 cm × 5–10 mm, tan to stramineous, glabrous. **Lamina** 1-pinnate, with mostly 15 pairs of elliptic lateral pinnae and a similar terminal one; pinnae mostly 20–30(–40) × 4–7 cm, proximal ones sessile or nearly so, the base rounded to truncate, margin entire to crenulate, apex acuminate. **Bud(s)** not seen. **Rachis** glabrous. **Veins** arising from costae of fertile pinnae ca. 6–8 per 3 cm, secondary veins nearly straight, uniting at an obtuse angle and giving rise to a usually free excurrent veinlet; areoles of fertile pinnae about as long as broad, in rows of mostly 13–20 between costa and pinna margin. **Indument** abaxially usually lacking, lamina adaxially glabrous. **Sori** oblong to arcuate on the cross-veins, infrequently biseriate between main lateral veins and the sori

round to oblong, never completely confluent over the lamina at maturity, lacking trichomes; receptacle with yellow to orange, opaque, tubular glands; sporangial stalks glabrous.

Montane rain forests, 900 m, San Martín and Loreto.

Nicaragua to Panama; Colombia to Peru.

San Martín: Prov. Lamas, Alonso de Alvarado, San Juan de Pacayzapa, al este del Puente (Carretera a Moyobamba), *Schunke V. 5943* (F). **Loreto:** Varadero de Mazán from Río Amazonas to Río Napo, *Croat 19514A* (MO).

98. ***Thelypteris arcana*** (Maxon & Morton) Morton, Contr. U.S. Natl. Herb. 38: 42. 1967.

Dryopteris arcana Maxon & Morton, Bull. Torrey Bot. Club 65: 352, t. 11. 1938. TYPE: Ecuador, Napo, trail from Tena to Napo, *Mexia 7174* (holotype, US!; isotypes, F!, GH!, UC!, US!).

Stem short-creeping. **Leaves** 70–100 cm long, subdimorphic. **Petiole** up to ca. 60 cm × 6 mm, tan to stramineous, glabrous. **Lamina** 1-pinnate, with mostly 2–5 pairs of elliptic lateral pinnae and a similar terminal one; pinnae mostly 10–20 × 2.5–5.5 cm (fertile 1.5–2.5 cm wide), the proximal ones stalked 3–10 mm, the base cuneate, margin entire to crenulate, apex acuminate. **Bud(s)** not seen. **Rachis** glabrous. **Veins** arising from costae of fertile pinnae ca. 13–18 per 3 cm, secondary veins nearly straight (sterile subsigmoid), uniting at an obtuse angle and giving rise to an excurrent usually free veinlet; areoles of fertile pinnae about as long as broad, in rows of mostly 7–10 between costa and pinna margin. **Indument** abaxially lacking or of scattered orangish tubular glands along veins, lamina adaxially glabrous. **Sori** oblong to arcuate on the cross-veins, not confluent over the lamina at maturity; receptacle with orangish, stalked, tubular glands; sporangial stalks glabrous.

Lowland rain forests, 100–850 m, Loreto and Huánuco.

Ecuador to Bolivia.

Loreto: Varadero de Mazan from Río Amazonas to Río Napo, *Croat 19514* (MO, UC). **Huánuco:** Prov. Pachitea, Dist. Puerto Inca, ca. 14 km from a point across Río Pachitea from Puerto Inca, *D. Smith 1274* (MO).



1. Tumbes
2. Piura
3. Lambayeque
4. Cajamarca
5. Amazonas
6. La Libertad
7. San Martín
8. Loreto
9. Ancash
10. Huánuco
11. Lima
12. Pasco
13. Junín
14. Ucayali
15. Ica
16. Huancavelica
17. Ayacucho
18. Apurímac
19. Cuzco
20. Madre de Dios
21. Arequipa
22. Puno
23. Moquegua
24. Tacna

DEPARTMENTS OF PERU

Index to Names

Accepted names are in roman type, synonyms are in *italics*, and new names are in **boldface**. A page number is provided for the principal place, or the only place, where the name occurs.

- Acrostichum*
fendleri 68
thelypteris 6
Amauropelta 9
breutelii 9
cheilanthoides 34
concinna 29
deflexa 30
diplazioides 14
oligocarpa 15
opposita 32
pilosula 19
rivulorum 32
rudis 26
thomsonii 22
Amphineuron 39
opulentum 43
Aspidium
abruptum 46
atrorubens 24
biolleyi 62
cheilanthoides 34
coarctatum 32
conterminum 32
extensum 43
gongyloides 40
hispidulum 41
incanum 52
macrourum 44
navarrense 15
opulentum 43
pilosulum 19
pusillum 17
scalare 15
semihastatum 57
sprengelii 31
stipulare 44
uliginosum 3
- Bolbitis* 69
macrophylla 68
- Ceterach*
aspidioides 13
Christella 39
dentata 42
hispidula 41
parasitica 39
Ctenitis 3
Cyclosorus 39
dentatus 42
gongyloides 40
- Dryopteris* 2
subg. *Steiropteris* 46
anceps 68
- ancyriothrix* 63
andreana 76
angustifolia 74
arcana 76
aspidioides 13
var. *subhastata* 13
assurgens 30
asterothrix 62
atrorubens 24
balbisii 31
bangii 42
biformata 60
boqueronensis 26
brachyodus 49
brachypus 18
brausei 28
canadasii 21
caucaensis 28
cheilanthoides 34
var. *resinosofoetida* 34
chrysodioides
var. *goyazensis* 69
clypeata 65
coarctata 32
columbiana 15
comosa 49
concinna 29
consobrina 73
contermina 32
corazonensis 27
decussata 49
deflexa 30
deltoidea 46
densa 34
densiloba 52
dentata 42
desvauxii
f. *glandulosa* 71
diplazioides 14
dumetorum 27
eggersii 59
engelii 26
ensiformis 75
euchlora 25
extensa 43
falcata 75
furva 19
gigantea 68
glandulosa
var. *brachyodus* 49
glandulosolanosa 20
incana 52
jamesonii 56
jurgensenii 75
juvuensis 61
laevigata 24
lechleri 69
leprieurii 51
leucothrix 32
- limaensis* 20
lindigii 30
lingulata 75
linkiana 14
lomatosa 15
lugubriiformis 58
macbridei 19
macrophylla 68
macrotis 57
var. *nephrodioides* 56
mapiriensis 49
megalodus 64
mercurii 31
millei 28
mollis 42
multiformis 35
nitens 35
oligocarpa 15
oligophylla
var. *aequatorialis* 45
var. *kunzeana* 46
pachyrhachis
var. *bogotensis* 31
parasitica
var. *glanduligera* 41
patens 44
pavoniana 23
var. *contracta* 23
permollis 70
peruviana 23
phacelothrix 22
pilosohispida 27
pilosula 19
poiteana 65
ptarmiciformis 17
pteroidea 25
pusilla 17
pyramidata 58
quadrangularis 41
resinosofoetida 34
retrorsa 27
rimbachii 19
rivulorum 32
rudis 26
rufa 20
ruiziana 35
salzmännii 73
scalaris 16
sellensis 31
semihastata 57
serrata 71
simplicifrons 68
sprengelii 31
stuebelii 22
subandina 20
supina 26
supralineata 52
tetragona 64
thelypteris 6

- thomsonii* 22
tremula 9
tristis 61
uliginosa 3
valdepilosa 50
warmingii 56
- Glaphyropteris* 48
decussata 49
Goniopteris 52
biolleyi 62
crenata 52
eggersii 59
juruenensis 61
pennata 64
poiteana 65
pyramidata 58
tetragona 64
tristis 61
Grammitis
linkiana 14
Gymnogramma
diplazioides 14
polypodioides 14
- Lastrea*
cheilanthoides 34
nitens 35
poeppigiana 57
poiteana 65
rudis 26
scabriuscula 44
Lastreopsis 3
- Macrothelypteris* 3
torresiana 3
Megalastrium 3
Meniscium 66
andreaenum 76
angustifolium 74
arborescens 70
falcatum 75
giganteum 68
guyanense 68
jurgensenii 75
macrophyllum 68
salzmannii 73
serratum 71
- Nephrodium*
"carazanense" 27
brachypus 18
canadasii 21
caucaense 28
conspersum 42
corazonense 27
crassipes 31
deflexum 30
eggersii 59
gardnerianum 52
jamesonii 56
kunzeanum 46
- lechleri* 69
leprieurii 51
longipilosum 14
macradenium 21
macrotrichis 57
nemorale 62
pilosohispidium 27
quadrangulare 41
resinosofoetidum 34
retrorsum 27
schizotrichis 44
supinum 26
valdepilosum 50
- Phegopteris*
laevigata 24
membranacea 69
mollis 70
Polypodium
abruptum 58
balbisii 31
brachyodus 49
concinnum 29
crenatum 65
crossii 23
decussatum 49
dentatum 41
euchlorum 25
megalodus 64
molle 41
nitens 35
oligocarpum 15
oppositum 32
patens 44
pavonianum 23
pennatum 64
pteroideum 25
reticulatum 66
rivulorum 32
rude 26
rufum 20
ruizianum 35
salicifolium 74
tetragonum 64
thomsonii 22
tottum 40
triste 60
Polystichum
torresianum 3
Pronephrium 66
Pteris
interrupta 40
- Steiropteris* 46
gardneriana 52
incana 52
leprieurii 51
valdepilosa 50
- Thelypteridaceae* 2
Thelypteris 5
 sect. *Blennocaulon* 35
- sect. *Glaphyropteris* 46
 sect. *Lepidoneuron* 9
 sect. *Macrothelypteris* 3
 sect. *Phacelothrix* 36
 sect. *Steiropteris* 46
 sect. *Uncinella* 29
 subg. *Amauropelta* 9
 subg. *Cyclosorus* 39
 subg. *Goniopteris* 52
 subg. *Macrothelypteris* 3
 subg. *Meniscium* 66
 subg. *Steiropteris* 46
 subg. *Thelypteris* 6
abrupta 58
aequatorialis 45
ancyrothrix 63
andicola 16
andreaena 76
angustifolia 74
arborea 24
arborescens 70
arcana 76
arenosa 33
argentina 21
arrecta 36
aspidioides 13
assurgens 30
atorrubens 24
balbisii 31
biformata 60
biolleyi 62
brachyodus 50
brachypus 18
brausei 28
canadasii 21
caucaensis 28
cheilanthoides 34
 var. *resinosofoetida* 34
chrysodioides
 var. *goyazensis* 69
clivalis 45
clypeata 65
coarctata 32
comosa 49
comptula 23
concinna 29
confluens 6
consobrina 73
conspersa 42
contermina 32
corazonensis 27
ctenitoides 37
curta 60
decussata 48
 var. *decussata* 49
 var. *mapiriensis* 49
 var. *velutina* 48
deflexa 30
deltoides 46
demissa 21
densa 34
dentata 41
depilata 45
diplazioides 14
dudleyi 33
dumetorum 27

- eggersii 59
enigmatica 16
 ensiformis 75
erythrothrix 59
 euchlora 25
extensa 43
cxuta 37
falcata 75
frigida 18
funkii 18
furfuracea 34
furva 19
gardneriana 52
gigantea 68
glandulosa
 var. *brachyodus* 49
 var. *glandulosa* 50
 var. *longipilosa* 50
glandulosolanosa 20
gongylodes 40
grandis
 var. *aequatorialis* 45
 var. *grandis* 46
 var. *kunzeana* 46
 var. *pallescens* 46
guyanensis 68
hispidula 41
 var. *inconstans* 41
 var. *versicolor* 41
hutchisonii 29
interrupta 40
invisa
 var. *kunzeana* 46
jamesonii 56
juruensis 61
killipii 60
laevigata 24
lancea 74
leoniae 18
leprieurii 51
 var. *glandifera* 52
 var. *incana* 52
 var. *leprieurii* 51

leucothrix 32
limaensis 20
limbata 9
lindigii 30
lingulata 75
linkiana 14
lomatosa 15
longifolia 70
 f. *glandulosa* 71
longipilosa 14
loretensis 30
lugubriformis 58
macbridei 19
macrophylla 68
macrotis 57
mapiriensis 49
maxoniana 71
megalodus 64
membranacea 69
mercurii 31
micula 33
millei 28
multiformis 35
navarrensii 15
nemoralis 62
nitens 35
oligocarpa 15
oligophlebia 3
opposita 32
opulenta 43
pachyrhachis 31
 var. *bogotensis* 31
 var. *sprucei* 31
palustris 6
parasitica 39
patens 43
 var. *dissimilis* 44
 var. *patens* 44
 var. *scabriuscula* 44
 var. *smithiana* 44
pavoniana 23
pennata 64

pennellii 50
peripae 60
peruviana 23
phacelothrix 22
pilosohispida 27
pilosula 19
pinnatifida 56
poiteana 65
proboscidea 36
ptarmiciformis 17
pteroidea 25
pusilla 17
quadrangularis 41
 var. *quadrangularis* 41
 var. *repens* 41
resinosofoetida 34
reticulata 66
retrorsa 27
rudis 25
rufa 20
ruiziana 35
salicifolia 74
salzmannii 73
scalaris 15
schunkei 63
semihastata 57
serrata 71
sodiroidi 62
sprengelii 31
subandina 20
supina 26
tetragona 64
thomsonii 22
torresiana 3
totta 40
tristis 60
tryonorum 62
urbanii 64
valdepilosa 50
 Thelypterioideae 3
 Trigonospora 2